

Supporting Information

Excited-State Energy-Transfer Dynamics in Self-Assembled Triads Composed of Two Porphyrins and an Intervening Bis(dipyrrinato)metal Complex

Lianhe Yu, Kannan Muthukumaran, Igor V. Sazanovich,
Christine Kirmaier, Eve Hindin, James R. Diers, Paul D. Boyle,
David F. Bocian, Dewey Holten, and Jonathan S. Lindsey

Table of Contents:

I. Results	1-6
II. Characterization Data	6-114

I. Results

1. Attempts to prepare bis(dipyrrinato)metal complexes with CaCl₂, MgBr₂·OEt₂, MgI₂, or Cd(OAc)₂·2H₂O. We explored the preparation of the dipyrrin metal complexes with CaCl₂, MgBr₂·OEt₂, (DIEA-MgI₂) or Cd(OAc)₂·2H₂O (Scheme SI-1). The results were as follows: (1) A solution of **2a** in CHCl₃ was treated overnight with TEA (5 equiv) and CaCl₂ (5 equiv) in methanol at room temperature. TLC and UV-Vis analysis indicated no **Ca-2a** was formed. (2) A solution of **2a** in CHCl₃ was treated overnight with TEA (20 equiv) and Cd(OAc)₂·2H₂O (200 equiv) in methanol. TLC and UV-Vis analysis showed no **Cd-2a** was formed. (3) A solution of **2a** in CH₂Cl₂ was treated with TEA (40 equiv) and MgBr₂·OEt₂ (20 equiv) at room temperature. TLC and UV-Vis analysis showed no reaction even after overnight. (4) Further experiments to prepare **Mg-2j** also failed. In this case, two methods were examined to attempt to prepare **Mg-2j**. We have developed methods for the preparation of Mg-porphyrins at room temperature employing heterogeneous or homogeneous procedures.¹ The same procedures were also employed for preparing **Mg-2j**: (a) Heterogeneous procedure: A solution of **2j** in CH₂Cl₂ was treated with DIEA (20 equiv) and MgI₂ (10 equiv) at room temperature. UV-Vis analysis showed no reaction even after 24 h. (b) Homogeneous procedure: A solution of **2j** in CH₂Cl₂ was treated with a freshly prepared “DIEA-MgI₂” reagent at room temperature. UV-Vis analysis of the crude reaction mixture indicated no reaction occurred even after overnight.

2. Control experiments (Suzuki coupling).

Suzuki coupling reactions were performed in the presence of a dipyrrin, a dipyrrin-zinc(II) complex, a dipyrrin-copper(II) complex or a dipyrrin-palladium(II) complex. We performed a Suzuki cross-coupling reaction (Scheme SI-2) of an iodo-porphyrin (**13**)² and a boronate-porphyrin (**14**)² in the presence of an equimolar amount of free base dipyrrin **2a** under conditions similar to those used previously:² Pd(PPh₃)₄ (15 mol%) as catalyst; K₂CO₃ (8 eq) as base; DMF/toluene (1:2, 20 mM) as solvent and at temperature of 90-95 °C under argon. The analytical SEC trace of the reaction mixture (after 22 h at 90-95 °C) indicated no formation of dimer (**15**).

The same Suzuki coupling reaction was carried out as shown in Scheme SI-2, but in the presence of an equimolar amount of bis(dipyrrinato)copper(II) complex **Cu-2b** instead of free base dipyrrin **2a**. Analytical SEC indicated only a 5.3% yield of the dimer was formed after 17 h at 90-95 °C. However, LD-MS analysis of this reaction mixture did not show the presence of the desired dimer peak. We next examined the same Suzuki coupling in the presence of an equimolar amount of the bis(dipyrrinato)zinc(II) complex **Zn-2a**. TLC and analytical SEC analysis showed no reaction occurred after overnight. However, when the same Suzuki coupling

reaction was carried out in the presence of an equimolar amount of bis(dipyrrinato)palladium(II) **Pd-2b** instead of 5-phenyldipyrrin (**2b**), analytical SEC indicated that the dimer was formed in 64% yield ($t_R = 10.79$ min) after 15 h at 90-95 °C. In summary, Suzuki coupling can be performed in the presence of a bis(dipyrrinato)palladium(II) complex.

(ZnP-dp)₂ triad. We first attempted to synthesize the (ZnP-dp)₂ triad **12** by direct coupling of the boronate-substituted porphyrin **Zn-5** and bis(dipyrrinato)zinc(II) complex **Zn-2c** via the Suzuki reaction (Scheme SI-3). However, no triad was formed under the conditions we employed in the construction of phenylene-linked porphyrin arrays, i.e., Pd(PPh₃)₄ (30 mol%) as catalyst, K₂CO₃ (16 eq relative to boronate porphyrin) as base, toluene/DMF (2:1) as solvent at 90 °C for 15-24 h.² Reaction of the bromo-substituted porphyrin **Zn-4** and boronate-substituted bis(dipyrrinato)zinc(II) complex **Zn-2d** under the above mentioned conditions also failed to give the desired (ZnP-dp)₂ triad. This is consistent with the results from control experiments.

3. Dipyrrromethane-dicarbinol + dipyrrin under Yb(OTf)₃/CH₂Cl₂ conditions.

To examine the reactivity of a dipyrrin towards the new acid-catalyzed condensation conditions (porphyrin formation via dipyrrromethane-dicarbinol + dipyrrromethane route), three control experiments were performed as follows:

(i) Dipyrrromethane-dicarbinol + dipyrrin (in the absence of dipyrrromethane). A direct examination of the reactivity of a dipyrrin towards a dipyrrromethane-dicarbinol was carried out as follows: A solution containing equimolar amounts of 5-phenyldipyrrin (**2a**) and the dipyrrromethane-dicarbinol **11a-diol** derived from 1,9-bis(*p*-toluoyl)-5-phenyldipyrrromethane (2.5 mM each in CH₂Cl₂) was treated with Yb(OTf)₃ (3.2 mM) (Scheme SI-4). LD-MS analysis of the oxidized reaction mixture after 40 min indicated a weak peak at $m/z = 641.6$, corresponding to the trans-substituted porphyrin. UV-Vis analysis of the crude reaction mixture indicated ~2.5% yield of porphyrin product.

(ii) Dipyrrromethane-dicarbinol + dipyrrin (in the absence of dipyrrromethane) + AcOH (100 molar equivalents): Deactivation of the dipyrrin. UV-Vis spectroscopic analysis of a 2.5 mM solution of 5-phenyldipyrrin (**2a**) in CH₂Cl₂ showed that at least 100 molar equivalents of AcOH was required to completely protonate the free base dipyrrin. Accordingly, 100 molar equivalents of AcOH was added to a solution of 5-phenyldipyrrin (**2a**) and the condensation with a dipyrrromethane-dicarbinol (**11a-diol**) was carried out under the same conditions as in (i). LD-MS and UV-Vis analysis of the oxidized reaction mixture at 40 min showed no detectable peaks corresponding to a porphyrin. An equimolar amount of 5-phenyldipyrrromethane (**1a**) was added to the reaction mixture followed by stirring for 40 min; removal of a sample and oxidation with DDQ followed by spectroscopic analysis indicated porphyrin formation in 13% yield (based on $\epsilon_{\text{Soret}} = 500,000 \text{ M}^{-1}\text{cm}^{-1}$). However, LD-MS analysis also showed scrambled products (total of four porphyrin peaks were observed: $m/z = 613.2$, *meso*-tetraphenylporphyrin; 627.1, 5-(4-methylphenyl)-10,15,20-triphenylporphyrin; 641.2, the desired product 5,15-bis(4-methylphenyl)-10,20-diphenylporphyrin; 655.2, 5,10,15-tris(4-methylphenyl)-20-phenylporphyrin (Scheme SI-5). While titration of the dipyrrin with acid suppressed reaction of the dipyrrin, this approach also caused acidolytic scrambling, leading to the formation of undesired porphyrin products. We next performed a competitive reaction between a dipyrrromethane and a dipyrrin towards a dipyrrromethane-dicarbinol.

(iii) Dipyrrromethane-dicarbinol + dipyrrin + dipyrrromethane: Competitive reaction between dipyrrromethane and dipyrrin towards dipyrrromethane-dicarbinol. A competitive reaction between a dipyrrromethane and a free base dipyrrin towards a dipyrrromethane-dicarbinol under the new acid-catalyzed porphyrin-forming conditions (3.2 mM of Yb(OTf)₃ in CH₂Cl₂) was examined as follows. A solution containing an equimolar amount of 5-

phenyldipyrromethane (**1a**), 5-(4-*tert*-butylphenyl)dipyrin (**2b**) and dipyrromethane-dicarbinol **11a-diol** (2.5 mM each) was treated with Yb(OTf)₃ (3.2 mM) in CH₂Cl₂ (Scheme SI-6). LD-MS analysis showed only those porphyrin species derived from reaction of 5-phenyldipyrromethane (**1a**) and the dipyrromethane-dicarbinol **11a-diol** at $m/z = 641.9$. No porphyrin peak derived from 5-(4-*tert*-butylphenyl)dipyrin (**2b**) and the dipyrromethane-dicarbinol **11a-diol** was observed. The usual work up and column chromatographic purification afforded the desired porphyrin **16** in 18% yield. LD-MS and ¹H NMR spectroscopic analysis showed the expected porphyrin free of any scrambled product.

Conclusion: The dipyrin reacts with the dipyrromethane-dicarbinol affording the porphyrin in ~2.5% yield. However, a dipyrromethane reacts with a dipyrromethane-dicarbinol in the presence of an equimolar amount of dipyrin affording the desired porphyrin without formation of scrambled products. In other words, no competing reaction between the dipyrin and the dipyrromethane-dicarbinol was detected in the presence of the dipyrromethane.

4. Notes on chromatography.

The purification of all free base dipyrins (**2**) and the metal complexes **Zn-2**, **Cu-2** and **Pd-2** was accomplished by chromatography on silica gel. The following observations are noteworthy: (1) The free base dipyrins and their Zn and Pd complexes (with no porphyrins attached) showed streaking on silica chromatography, preventing any discrete bands to be observed. During metalation, any remaining free base dipyrin was easily removed by washing with methanol since the zinc complexes prepared herein have poor solubility in methanol. On the other hand, the Cu complex did not streak and the starting dipyrin was readily removed by chromatography. (2) The zinc complexes demetalate on alumina column and the free base dipyrin binds very tightly to alumina. (3) Porphyrin–dipyrin **7** was chromatographed on silica and give a tight band similar to those of porphyrins lacking a dipyrin unit. (4) The all-zinc triad **12** could not be chromatographed on silica owing to the complete demetalation of the zinc-dipyrin complex, affording the porphyrin-substituted free base dipyrin **7**. However, the (ZnP-dp)₂Pd triad **6** was successfully chromatographed on a silica column without any demetalation of the bis(dipyrinato)Pd complex.

5. Static and Time-Resolved Optical Spectroscopy.

(i) **Static Absorption Spectroscopy.** The absorption spectra of triad **12a** and **12b** and their reference compounds in toluene or benzonitrile are shown in Figures SI-1 to SI-7 (solid spectra). The absorption spectrum of (ZnP-dp)₂Zn triad **12b** is essentially the sum of the spectra of reference zinc porphyrin **Zn-8b** and bis(dipyrinato)zinc complex **Zn-2b** in toluene (Figure SI-1), as is the case for triad **12a** and its reference compounds **Zn-8a** and **Zn-2a**. For each triad, the ultimate porphyrin absorption characteristics in the triad derive mainly from the addition of the aryl ring at the linker site to the starting porphyrin (e.g., **Zn-3**) to give **Zn-8a** or **8b**, with little change upon attachment of the dipyrin to give porphyrin–dipyrin **Zn-7a** or **Zn-8b**, or upon self-assembly to produce (ZnP-dp)₂Zn triad **12a** or **12b** (Figure SI-2 and SI-3). Similar findings were obtained for the compounds in benzonitrile, except that metal coordination red shifts the zinc porphyrin absorption bands by 5-10 nm and alters the Q-band ratios; in contrast, the (dp)₂Zn features are unperturbed (Figures SI-4 to SI-7).

(ii) **Static Fluorescence Spectra.** The spectral differences of **12a** or **12b** (and their component parts) in toluene or benzonitrile are shown in Figures SI-1 to SI-7 (dashed or dotted spectra) and further described as follows. (1) The emission from the triads **12a** and **12b** in both solvents occurs primarily from the porphyrin(s), showing the same features present for reference

compounds **Zn-8a** or **Zn-7a** and **Zn-8b** or **Zn-7b** (using direct excitation of either the porphyrin or the (dp)₂Zn complex). (2) Due to solvent ligation, the porphyrin emission bands are red shifted and the intensity-ratios altered in parallel with the absorption spectra. (2) The fluorescence from bis(dipyrrinato)zinc reference complex **Zn-2a** has rough mirror symmetry to the absorption in both toluene and benzonitrile. (3) The absorption-emission (Stokes) shift for complex **Zn-2a** decreases to ~460 cm⁻¹ from ~660 cm⁻¹; this change is due solely to a blue shift of the emission in benzonitrile, namely to an excited-state effect.

(ii) Time-resolved Absorption Spectra and Kinetics. Transient absorption spectra and kinetics traces obtained for triad **12b** in toluene (Figure SI-8) are similar to those for the triad **12a** in toluene as described in the paper. These findings include the same [(dp)₂Zn]* lifetime of 1.4 ps, which is the average value from several probe wavelengths. Using standard methods,³ energy transfer from [(dp)₂Zn]* to a zinc porphyrin subunit has rate constant $k_{\text{EnT}} = (2 \bullet 1.4 \text{ ps})^{-1} - (93 \text{ ps})^{-1} = (2.8 \text{ ps})^{-1}$ and yield $\Phi_{\text{EnT}} = [1 - 2 \bullet (1.4 \text{ ps}) / (93 \text{ ps})] = 0.97$. The factors of 2 derive from the presence of two zinc porphyrin energy acceptors per central (dp)₂Zn complex in each (ZnP-dp)₂Zn triad. The overall yield of energy transfer from [(dp)₂Zn]* to the porphyrin units in each triad is $\Phi_{\text{EnT}}^{\text{total}} = [1 - (1.4 \text{ ps}) / (93 \text{ ps})] = 0.985$. Furthermore, for each dyad in toluene, once ZnP* is formed from [(dp)₂Zn]*, the ZnP* decay profile obtained the transient absorption data is in qualitative agreement with the fluorescence lifetime within experimental error, indicating little change from the reference porphyrins. Thus, ZnP* for the triads in toluene is not quenched appreciable (<10%) by deleterious processes such as charge transfer.

The excited-state dynamics are somewhat more complex for triads **12a** or **12b** in benzonitrile, is also the case for reference (dp)₂Zn complex **Zn-2a** (the latter to be described in detail elsewhere). Figure SI-9a shows representative transient absorption difference spectra for **12a** in benzonitrile using primary excitation of the central (dp)₂Zn moiety with a 484-nm 130-fs flash. Similar data are obtained for triad **12b** in benzonitrile. The spectrum at 0.5 ps spectrum has common characteristics to those found for each triad in toluene (Figure 4 of the paper and Figure SI-8), and can be assigned mainly to [(dp)₂Zn]* based on the sharp trough in the 500-525 nm region. This feature primarily reflects excited-state stimulated (by the white-light probe pulse) emission that coincides with the red side of the spontaneous emission from reference complex **Zn-2a** (Figure SI-4, dashed). State ZnP* also contributes to the 0.5 ps spectrum based on partial bleaching of the porphyrin Q(1,0) ground-state band at ~555 nm, Q(0,0) bleaching plus stimulated emission at ~600 nm, and Q(0,1) stimulated emission at ~660 nm. A contribution of the excited zinc porphyrin at early times likely derives from direct porphyrin excitation in a fraction of the arrays (in which (dp)₂Zn is not excited) and the early stage of energy transfer.

By 2.7 ps for **12a** and 2.5 ps for **12b** (Figures SI-9a and SI-10a, dashed lines), the [(dp)₂Zn]* stimulated emission has decayed and is replaced by ZnP* excited-state absorption along with further development of the ZnP* features noted above.⁴ Additional measurements using excitation at 500 nm that allow probing of the (dp)₂Zn ground-state absorption to shorter wavelengths do not rule out the possibility that some associated bleaching remains after [(dp)₂Zn]* decay. Such a bleaching would indicate that the ~2.5 ps spectrum for each dyad contains a contribution from a charge-separated state such as [(dp)₂Zn]⁻ ZnP⁺ formed by hole/electron transfer from [(dp)₂Zn]* in parallel with energy transfer to produce ZnP*. In other words, the spectrum at 2.7 ps may contain some charge-separated state in addition to ZnP*. The kinetic traces and fits in Figure SI-9b and Figure SI-10b show that decay of [(dp)₂Zn]* stimulated emission and growth of ZnP* (and perhaps some [(dp)₂Zn]⁻ ZnP⁺) absorption; this time profile combined with those at other probe wavelengths gives a [(dp)₂Zn]* lifetime of 0.8 ps for triads **12a** and **12b** in benzonitrile. These findings will be analyzed below along with other

results to estimate the relative yields of the $[(dp)_2Zn]^*$ energy- versus charge-transfer processes in the triads.

As time evolves past ~ 2.5 ps, the spectrum for each dyad shows relatively small readjustments (increased transient absorption to the red of the porphyrin Q(1,0) absorption bleaching at 555 nm and some reduction of transient absorption to the blue) to give the spectrum shown at 83 ps for **12a** and 200 ps for **12b** (Figures SI-9a and SI-10A, dashed-dotted lines). These changes clearly involve the porphyrin part of the triad, and could reflect electronic or conformational or ligation readjustment of ZnP^* , or recombination within any charge-separated state such as $[(dp)_2Zn]^- ZnP^+$ formed from $[(dp)_2Zn]^*$. The kinetic traces shown in Figure SI-9b and SI-10b (insets) combined with results at other probe wavelengths indicate that the time constant of this process is ~ 85 ps for **12a** and ~ 105 ps for **12b**.

The last kinetic stage seen for **12a** or **12b** in benzonitrile involves the decay of the ZnP^* . For the triad in toluene this decay occurs mainly by intersystem crossing to form the triplet excited state ZnP^T (as occurs in reference zinc porphyrins); this process is indicated by the porphyrin bleachings remaining at about the same amplitude during ZnP^* decay, along with disappearance of stimulated emission (Figure 4 of paper). On the other hand, the spectra at 3.4-3.7 ns for **12a** or **12b** in benzonitrile (Figures SI-9a and SI-10a, dotted lines) shows that the decay of stimulated emission (e.g. the dip at ~ 650 nm at earlier times) is accompanied by significant decay of the porphyrin ground-state bleachings and the overall transient absorption, indicating that significant ground-state recovery has occurred. The simplest interpretation of these observations is that a significant fraction of the ZnP^* decay for each triad in benzonitrile occurs by a process such as charge transfer, with the charge-separated product then decaying by charge recombination to the ground state with a time constant < 1 ns. Thus, the spectrum at 3.4-3.7 ns for each triad can be assigned largely to ZnP^T , which appears to form from ZnP^* with a yield of $\sim 30\%$ based on the magnitude of the long-time porphyrin bleaching compared to the amplitude at 83-200 ps (when referenced to the transient absorption; Figures SI-9a and SI-10a). The kinetic traces shown in Figures SI-9b and SI-10b (insets) combined with measurements at other probe wavelengths gives an average time constant of 0.7 ns for the third kinetic component for each triad. This value likely largely reflects the ZnP^* lifetime but may contain a contribution from the decay of the charge-separated state formed from ZnP^* .

These transient absorption data along with the fluorescence data described in the paper are analyzed to estimate the yields of the competing energy- and charge-transfer decay processes for both $[(dp)_2Zn]^*$ and ZnP^* in triads **12a** and **12b**. First, consider the decay of the $[(dp)_2Zn]^*$ excited state, which is a lifetime of 0.8 ps that is shorter than the value of 1.4 ps in toluene. If energy transfer is not particularly dependent on solvent (as we have found for through-bond mediated porphyrin-porphyrin transfer), then this shortening would be entirely due to a quenching process such as charge transfer not operable to an appreciable degree in toluene. In this case, the yield of this process would be $\leq 40\%$ in benzonitrile, giving a $\geq 60\%$ yield of energy transfer to the porphyrin to produce ZnP^* . In a separate analysis, the 0.8 ps lifetime of $[(dp)_2Zn]^*$ in each triad when compared to the shorter decay component of ~ 6.5 ps in $(dp)_2Zn$ reference complex **Zn-2a** gives a combined energy- and charge-transfer yield to each of the two porphyrins in each triad of $[1 - 2 \cdot (0.8/6.5)] \cdot 100 \sim 75\%$. This is the upper limit to the yield of energy transfer to each porphyrin assuming no competing charge transfer. However, the yield would approach 100% depending on the extent to which the 1000 ps kinetic component observed for reference $(dp)_2Zn$ complex **Zn-2a** contributes along with the 6.5 ps component to the $[(dp)_2Zn]^*$ reference lifetime. The porphyrin fluorescence yields obtained using excitation of one component of the triad versus the other described in the paper (Table 3) give an energy-transfer yield of $\sim 100\%$ for **12a** and $\sim 70\%$ for **12b**. Collectively these data indicate a yield of 80

$\pm 20\%$ for energy transfer from $[(dp)_2Zn]^*$ to each zinc porphyrin in each triad, with part of the remainder deriving from a competing quenching process such as charge transfer.

Turn now to the ZnP^* decay pathways triads **12a** and **12b** in benzonitrile. The 0.7 ns kinetic component that can be associated in part if not large measure to the ZnP^* decay (and perhaps in part to decay of a charge-separated state) is comparable to the faster (0.9 ns) of the two lifetime components observed for **12a** and **12b** by fluorescence decay (the other being ~ 2.2 ns, each with $\sim 50\%$ amplitude). Given these data and the associated possibility that more than one electronic/conformational/ligated form may contribute to the photophysics for each triad in benzonitrile, the effective ZnP^* lifetime is ~ 1 ns. The ZnP^* lifetime for the reference porphyrins in benzonitrile is ~ 2.6 ns (Table 3 of the paper). These effective lifetime data indicate that the quenching processes operable for the triads in benzonitrile have a yield of $[1 - (1/2.6)] \cdot 100 \sim 60\%$. A yield of 70% is estimated from the relative amplitudes of porphyrin bleaching for states ZnP^* and ZnP^T in the transient absorption data for the triads described above. Given the complexities associated with the data and analysis, an average yield of $60 \pm 20\%$ for quenching of ZnP^* in triads **12a** and **12b** in benzonitrile is reported in Table 3 of the paper.

References.

- (1) (a) O'Shea, D. F.; Miller, M. A.; Matsueda, H.; Lindsey, J. S. *Inorg. Chem.* **1996**, *35*, 7325–7338. (b) Lindsey, J. S.; Woodford, J. N. *Inorg. Chem.* **1995**, *34*, 1063–1069.
- (2) Yu, L.; Lindsey, J. S. *Tetrahedron* **2001**, *57*, 9285–9298.
- (3) Yang, S. I.; Lammi, R. K.; Seth, J.; Riggs, J. A.; Arai, T.; Kim, D.; Bocian, D. F.; Holten, D.; Lindsey, J. S. *J. Phys. Chem.* **1998**, *102*, 9426–9436. (b) Prathapan, S.; Yang, S. I.; Seth, J.; Miller, M. A.; Bocian, D. F.; Holten, D.; Lindsey, J. S. *J. Phys. Chem. B* **2001**, *105*, 8237–8248.
- (4) Rodriguez, J.; Kirmaier, C.; Holten, D. *J. Am. Chem. Soc.* **1989**, *111*, 6500–6506.

II. Characterization Data

Figure Captions.

Figure SI-1. Electronic absorption spectra (solid) and fluorescence spectra (dashed and dotted) for the triad **12b** (A) and reference porphyrin **Zn-8b** (B) and bis(dipyrrinato)zinc complex **Zn-2a** (C) in toluene at room temperature. The absorption spectra in the 450–650 nm region in A and B have been multiplied by the factors shown. The triad emission in A and B was obtained using predominant zinc porphyrin excitation (dashed spectrum) at 400 nm or bis(dipyrrinato)zinc excitation (dotted spectrum) at 487 nm. Spectra in the respective regions have been normalized to the same peak intensity, and the maxima (± 1 nm) indicated.

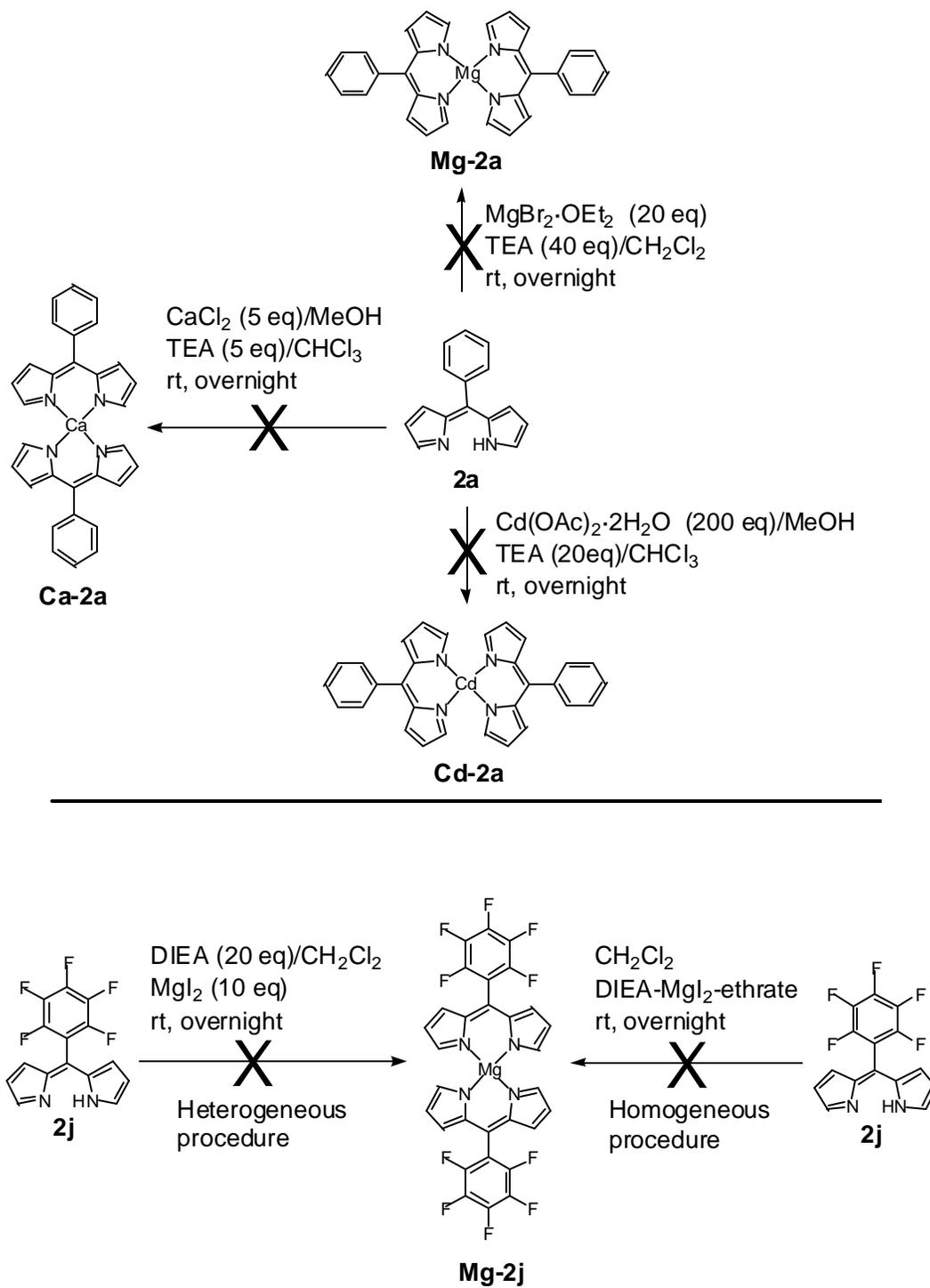
Figure SI-2. Electronic absorption spectra (solid) and fluorescence spectra (dashed) for the triad **12a** (A), porphyrin–dipyrrin **Zn-7a** (B), reference porphyrin **Zn-8a** (C) porphyrin **Zn-3** (D) and bis(dipyrrinato)zinc complex **Zn-2a** (E) in toluene at room temperature. Other details are the same as those for Figure SI-1.

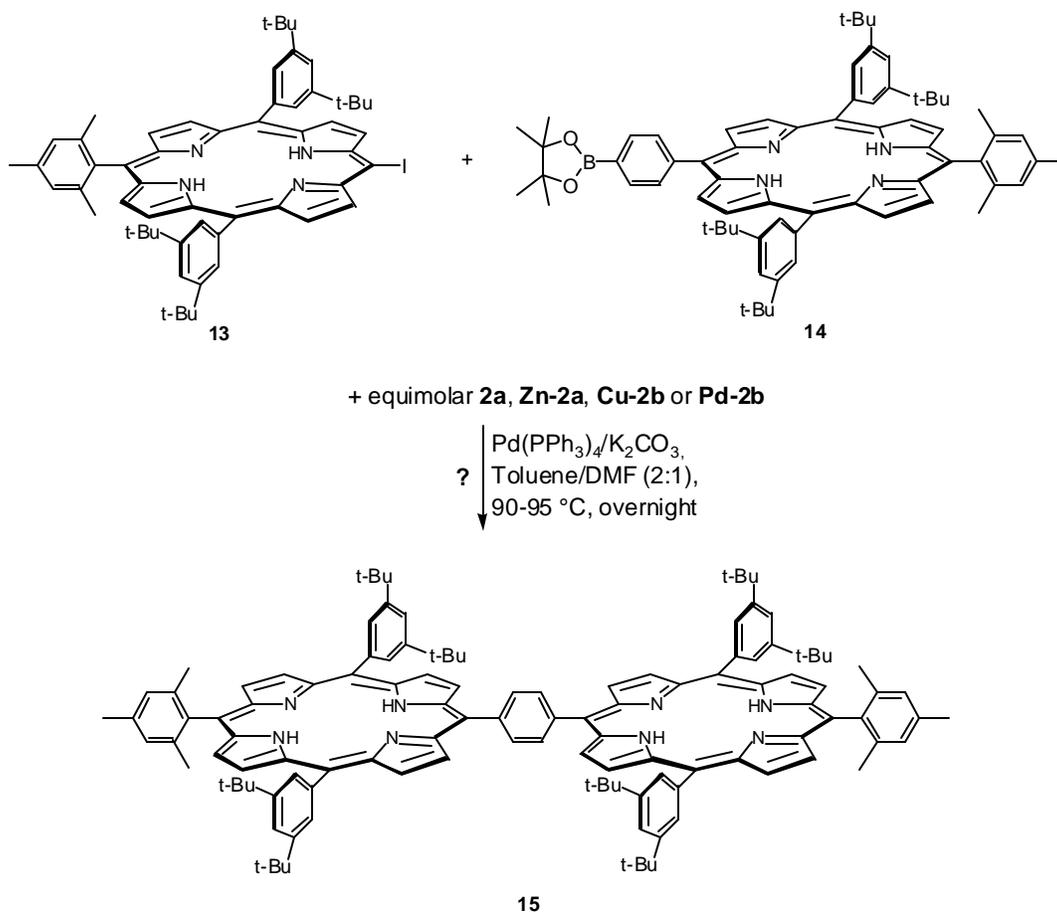
Figure SI-3. Electronic absorption spectra (solid) and fluorescence spectra (dashed) for the triad **12b** (A), porphyrin–dipyrrin **Zn-7b** (B), reference porphyrin **Zn-8b** (C) porphyrin **Zn-3** (D) and bis(dipyrrinato)zinc complex **Zn-2a** (E) in toluene at room temperature. Other details are the same as those for Figure SI-1.

Figure SI-4. Electronic absorption spectra (solid) and fluorescence spectra (dashed and dotted) for the triad **12a** (A), reference porphyrin **Zn-8a** (B) and bis(dipyrrinato)zinc complex **Zn-2a** (C) in benzonitrile at room temperature. The triad emission in A

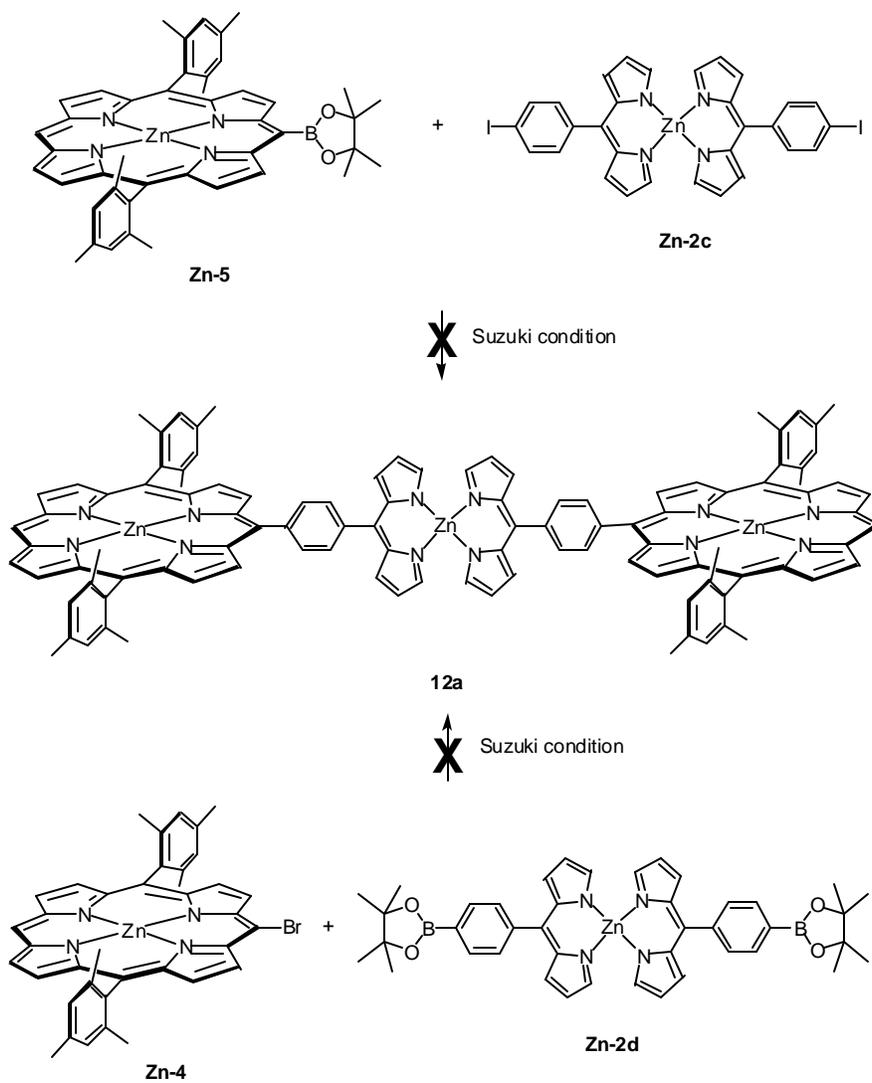
and B was obtained using predominant zinc porphyrin excitation (dashed spectrum) at 400 nm or bis(dipyrrinato)zinc excitation (dotted spectrum) at 453 nm. Other details are the same as those for Figure SI-1.

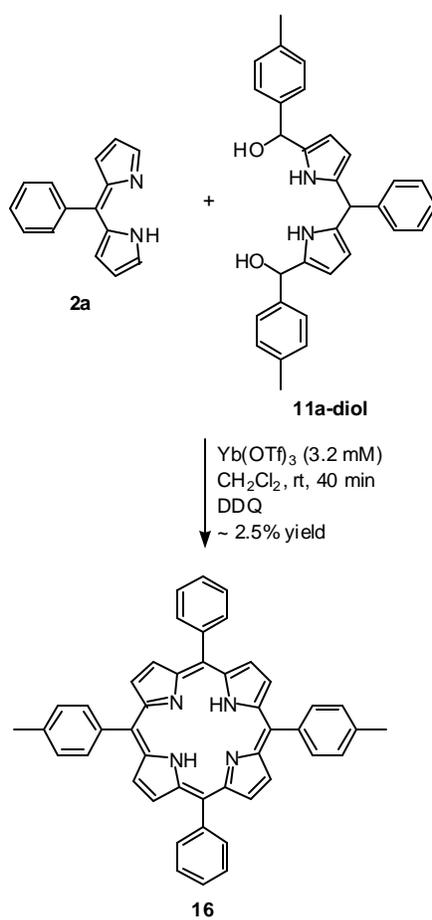
- Figure SI-5.** Electronic absorption spectra (solid) and fluorescence spectra (dashed and dotted) for the triad **12b** (A) and reference porphyrin **Zn-8b** (B) and bis(dipyrrinato)zinc complex **Zn-2a** (C) in benzonitrile at room temperature. The triad emission in A and B was obtained using predominant zinc porphyrin excitation (dashed spectrum) at 400 nm or bis(dipyrrinato)zinc excitation (dotted spectrum) at 487 nm. Other details are the same as those for Figure SI-1.
- Figure SI-6.** Electronic absorption spectra (solid) and fluorescence spectra (dashed) for the triad **12a** (A), porphyrin–dipyrrin **Zn-7a** (B), reference porphyrin **Zn-8a** (C) porphyrin **Zn-3** (D) and bis(dipyrrinato)zinc complex **Zn-2a** (E) in benzonitrile at room temperature. Other details are the same as those for Figure SI-1.
- Figure SI-7.** Electronic absorption spectra (solid) and fluorescence spectra (dashed) for the triad **12b** (A), porphyrin–dipyrrin **Zn-7b** (B), reference porphyrin **Zn-8b** (C) porphyrin **Zn-3** (D) and bis(dipyrrinato)zinc complex **Zn-2a** (E) in benzonitrile at room temperature. Other details are the same as those for Figure SI-1.
- Figure SI-8.** Representative time-resolved absorption spectra (A) and a kinetic profile at 538 nm (B) for the triad **12b** in toluene at room temperature using predominant excitation of the bis(dipyrrinato)zinc subunit with a 490-nm 130-fs flash. The 0.5 ps spectrum (solid line) was constructed from spectra at closely spaced time intervals in order to account for the time-dispersion of wavelengths in the white-light probe pulse. The fit to the data in (B) is the convolution of the instrument response with a dual exponential plus a constant, giving time constants of 1.3 ps and ~1.2 ns (inset). The average $(dp)_2Zn^*$ and ZnP^* lifetimes, respectively, deduced from measurements at a number of probe wavelengths (and fluorescence decays for ZnP^*) are given in Table 3 of the paper.
- Figure SI-9.** Representative time-resolved absorption spectra (A) and a kinetic profile at 503 nm (B) for the triad **12a** in benzonitrile at room temperature using predominant excitation of the bis(dipyrrinato)zinc subunit with a 484-nm 130-fs flash. The three-exponential fit gives the time constants shown, with average values from a number of probe wavelengths of 0.8 ps, 85 ps, and 0.7 ns. The fast component reflects $[(dp)_2Zn]^*$ decay and the assignment of the other two components are described in the Supporting Information text. Other details are the same as those for Figure SI-8.
- Figure SI-10.** Representative time-resolved absorption spectra (A) and a kinetic profile at 508 nm (B) for the triad **12b** in benzonitrile at room temperature using predominant excitation of the bis(dipyrrinato)zinc subunit with a 490-nm 130-fs flash. The three-exponential fit gives the time constants shown, with average values from a number of probe wavelengths of 0.8 ps, 105 ps, and 0.7 ns. Other details are the same as those for Figure SI-9.

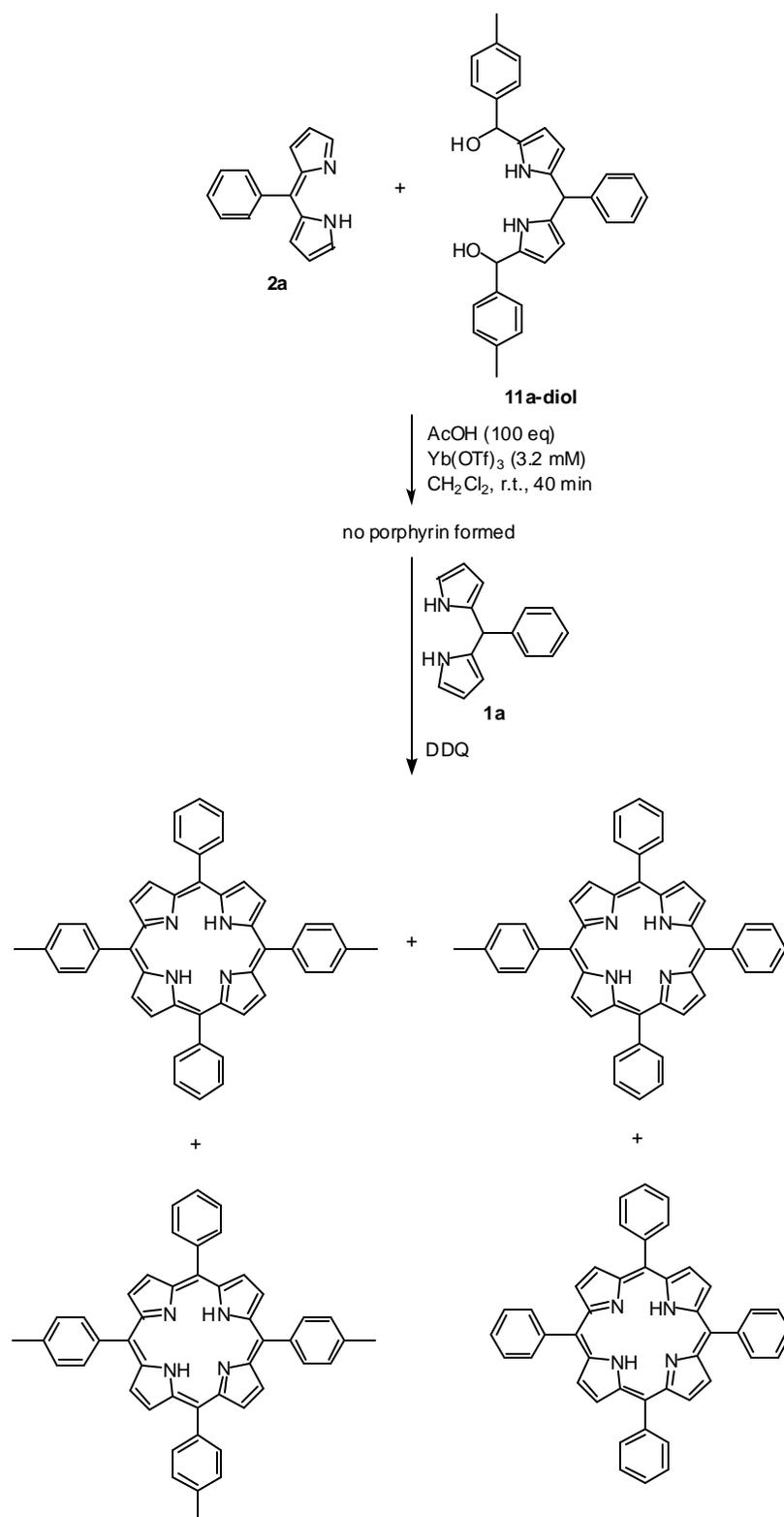




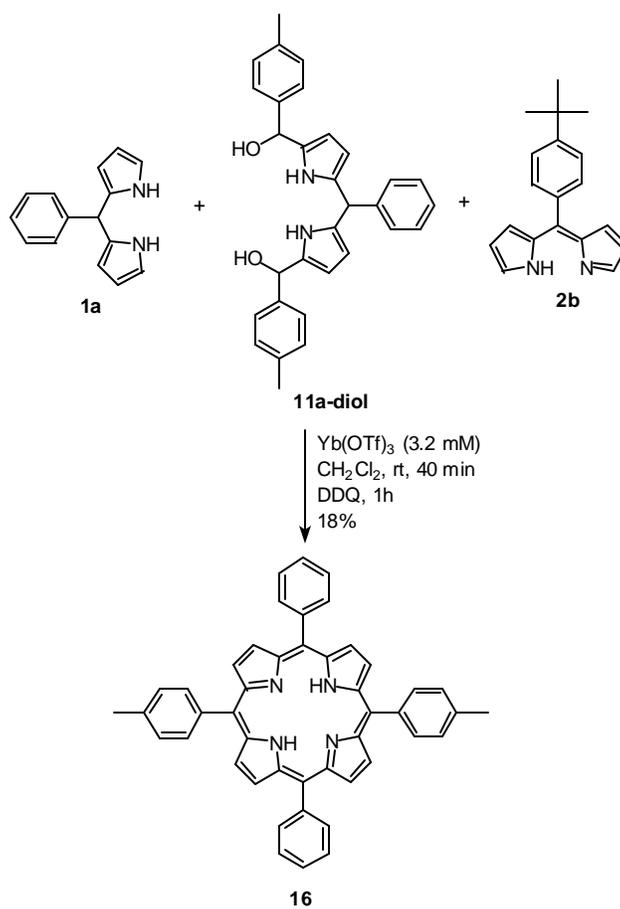
- (1) In the presence of **2a**: no Suzuki coupling
- (2) In the presence of **Zn-2a**: no Suzuki coupling
- (3) In the presence of **Cu-2b**: no Suzuki coupling
- (4) In the presence of **Pd-2b**: the yield of dimer was 64% (based on SEC)







13% total yield



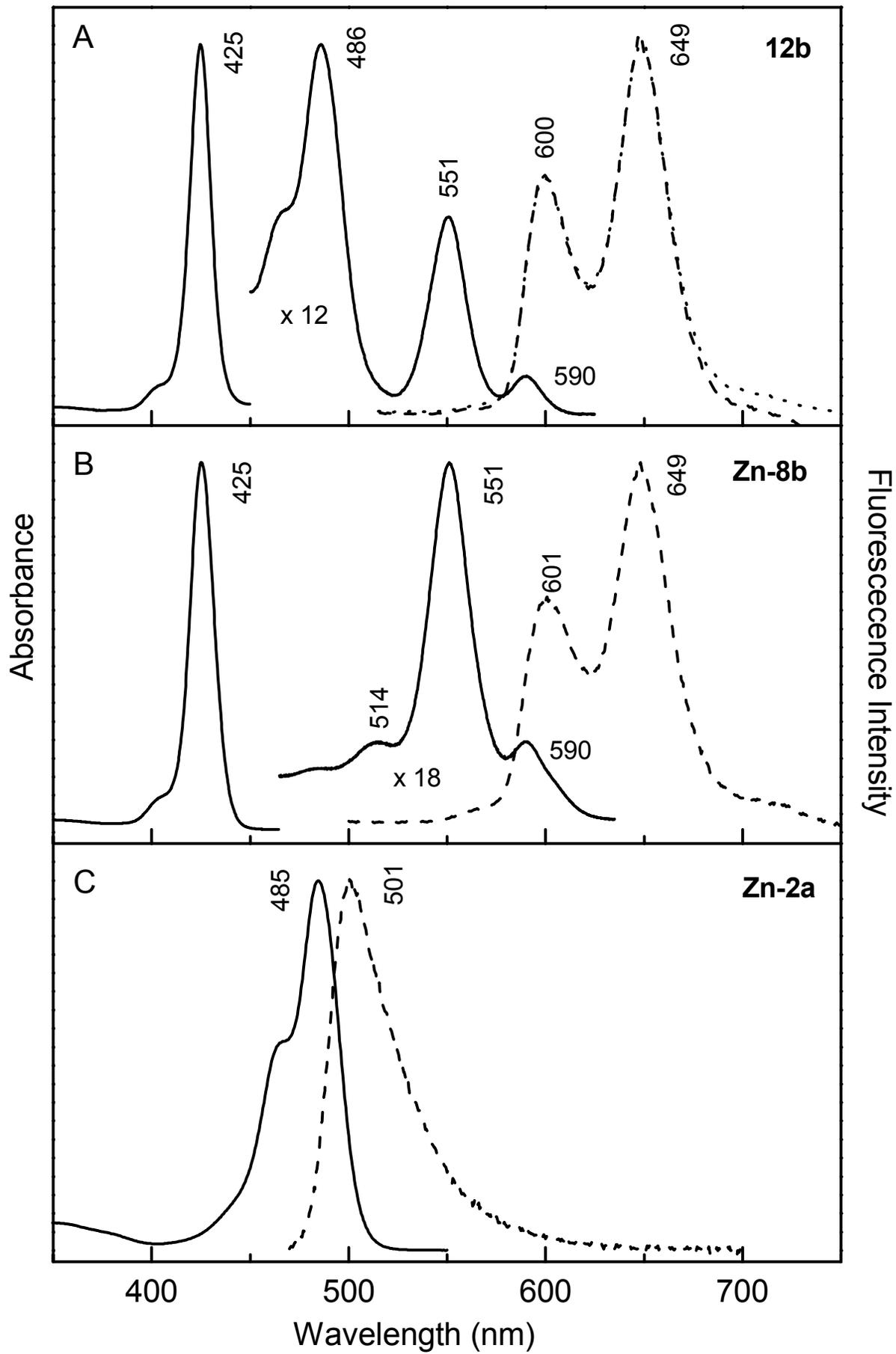


Figure SI-1

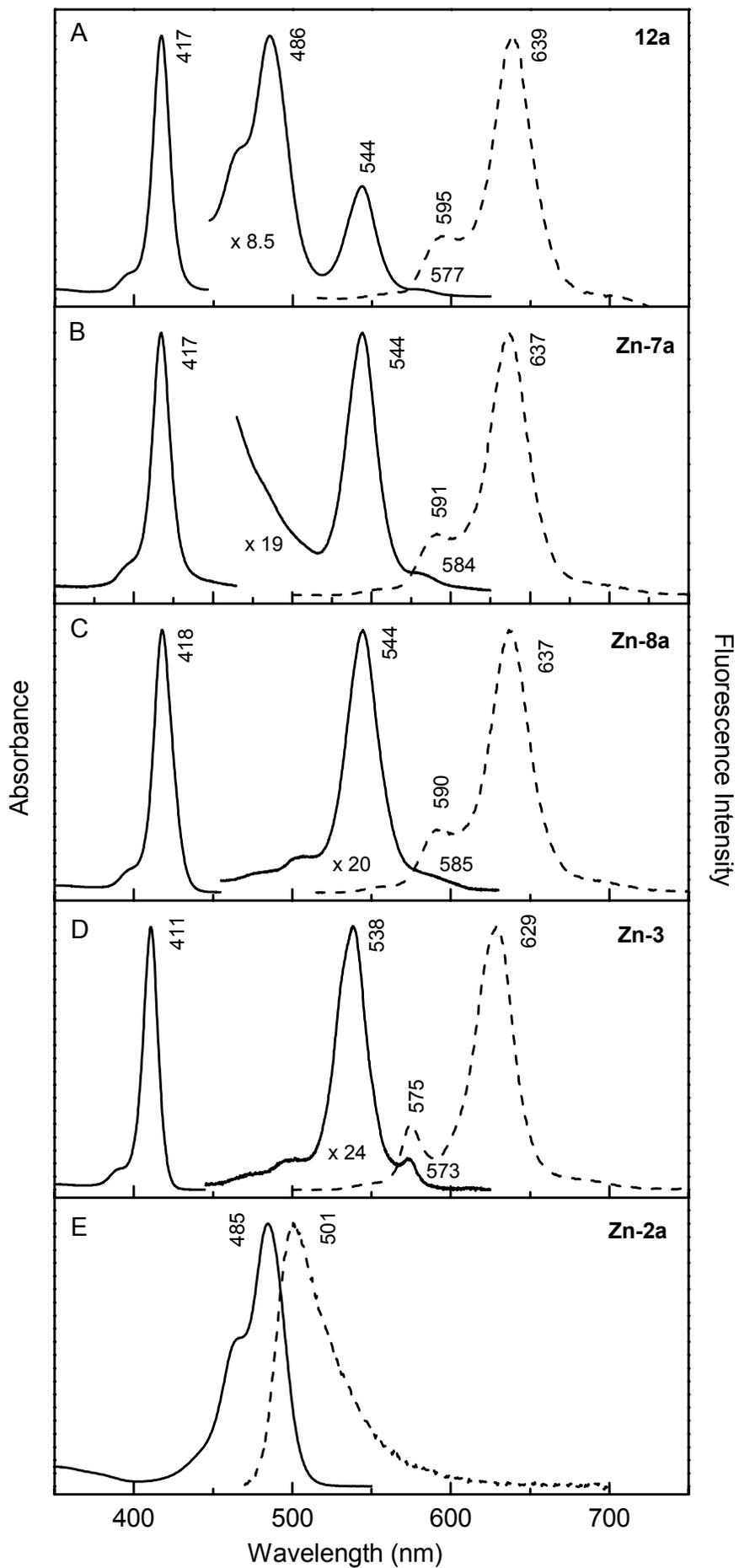


Figure SI-2

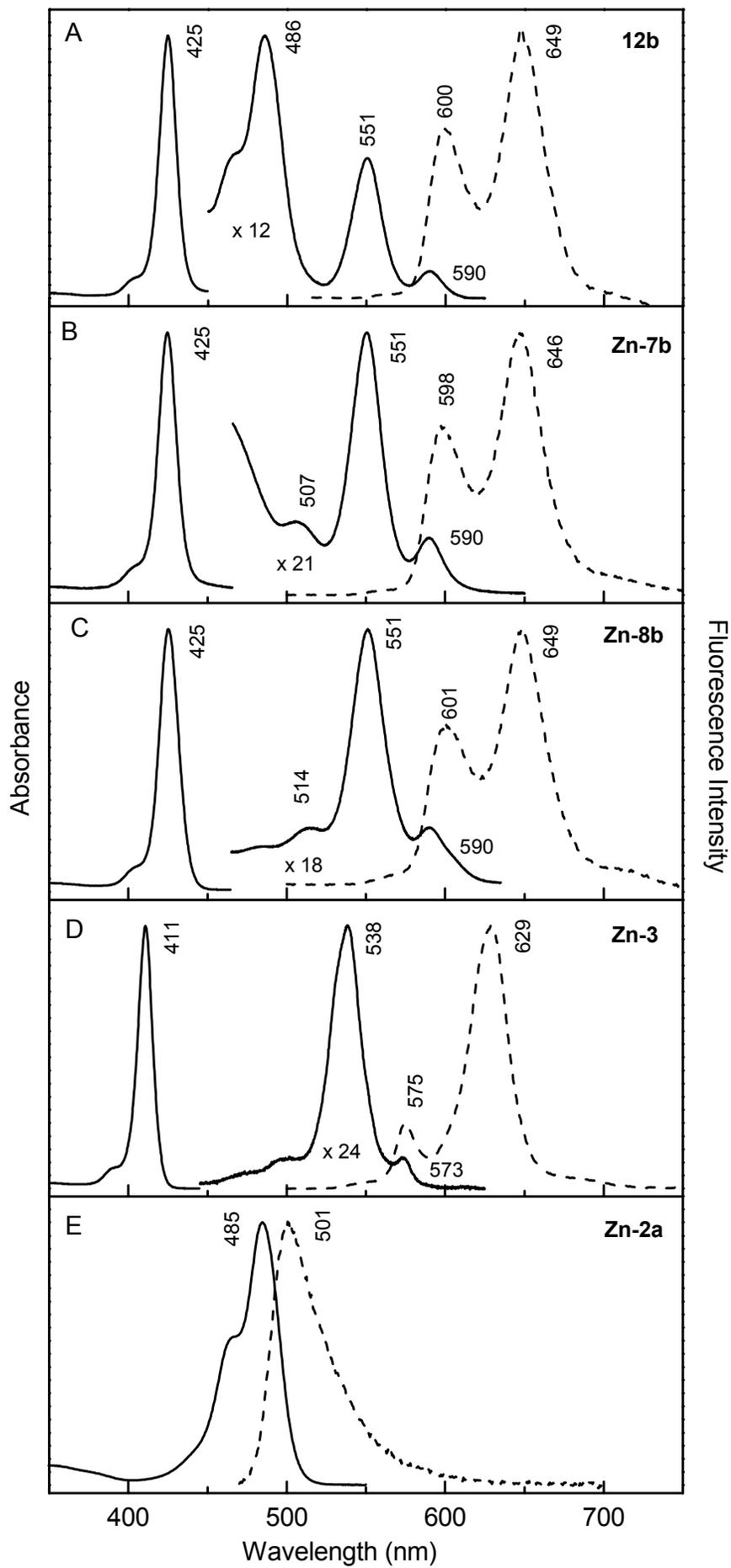


Figure SI-3

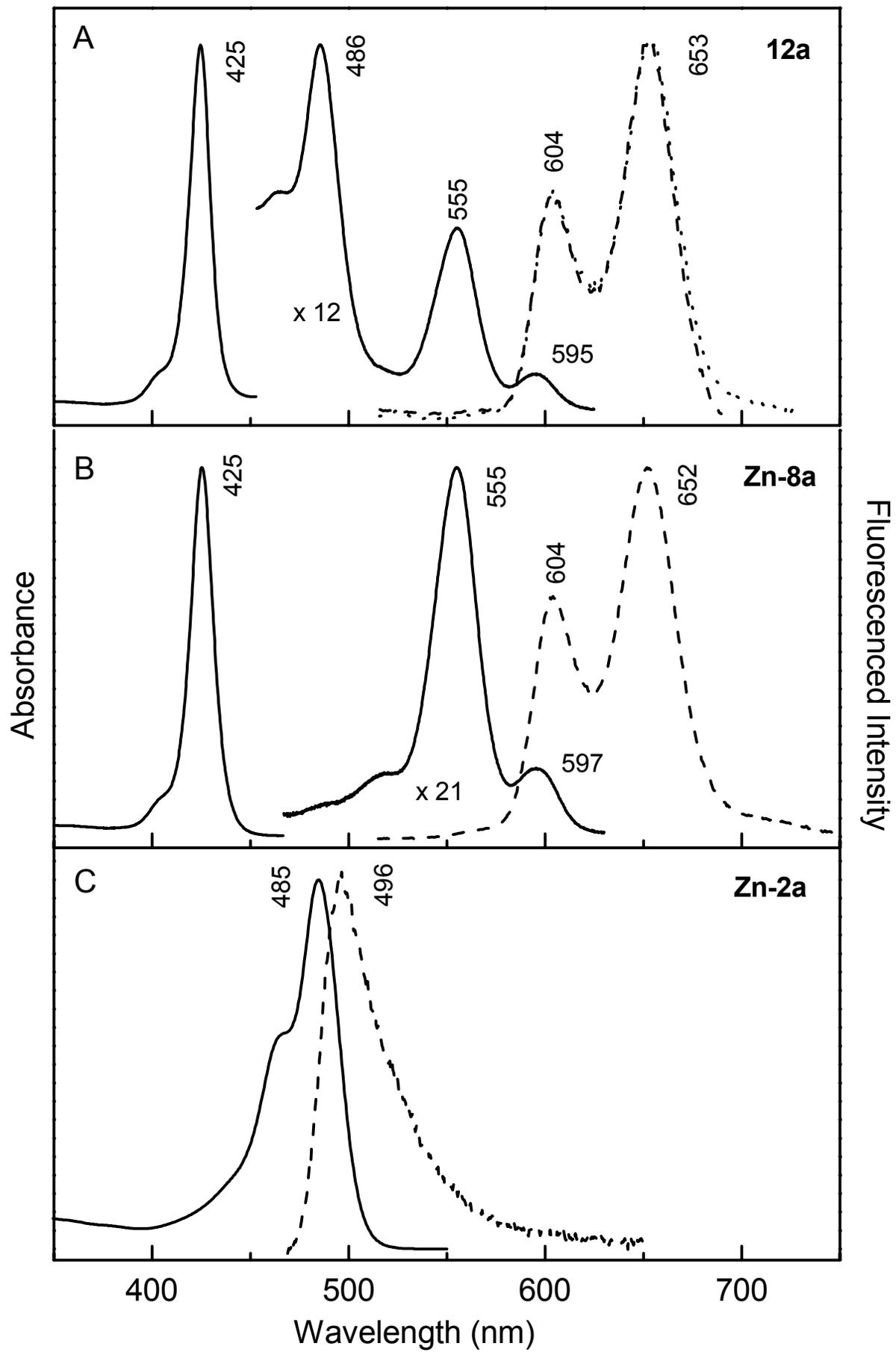


Figure SI-4

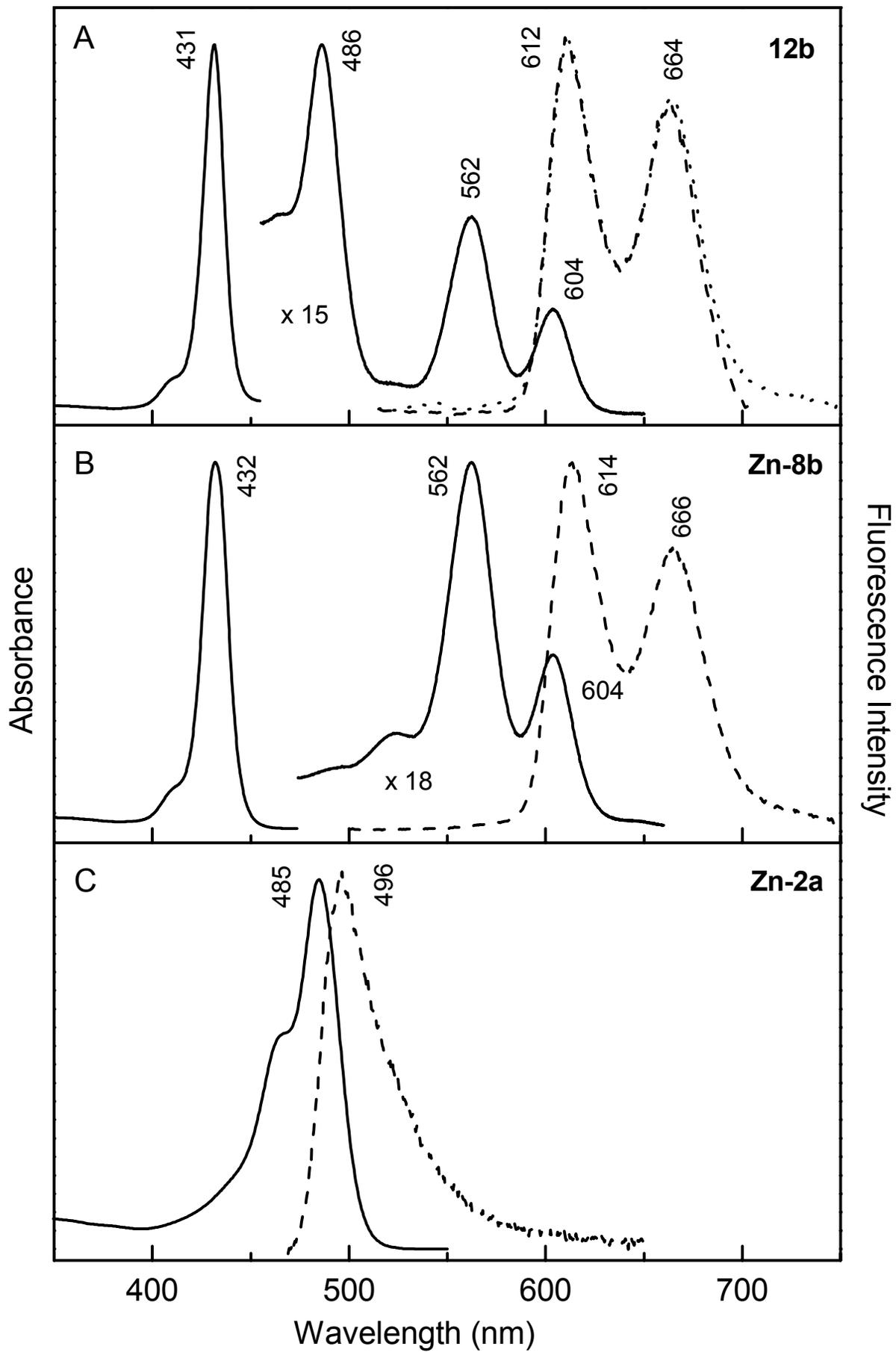


Figure SI-5

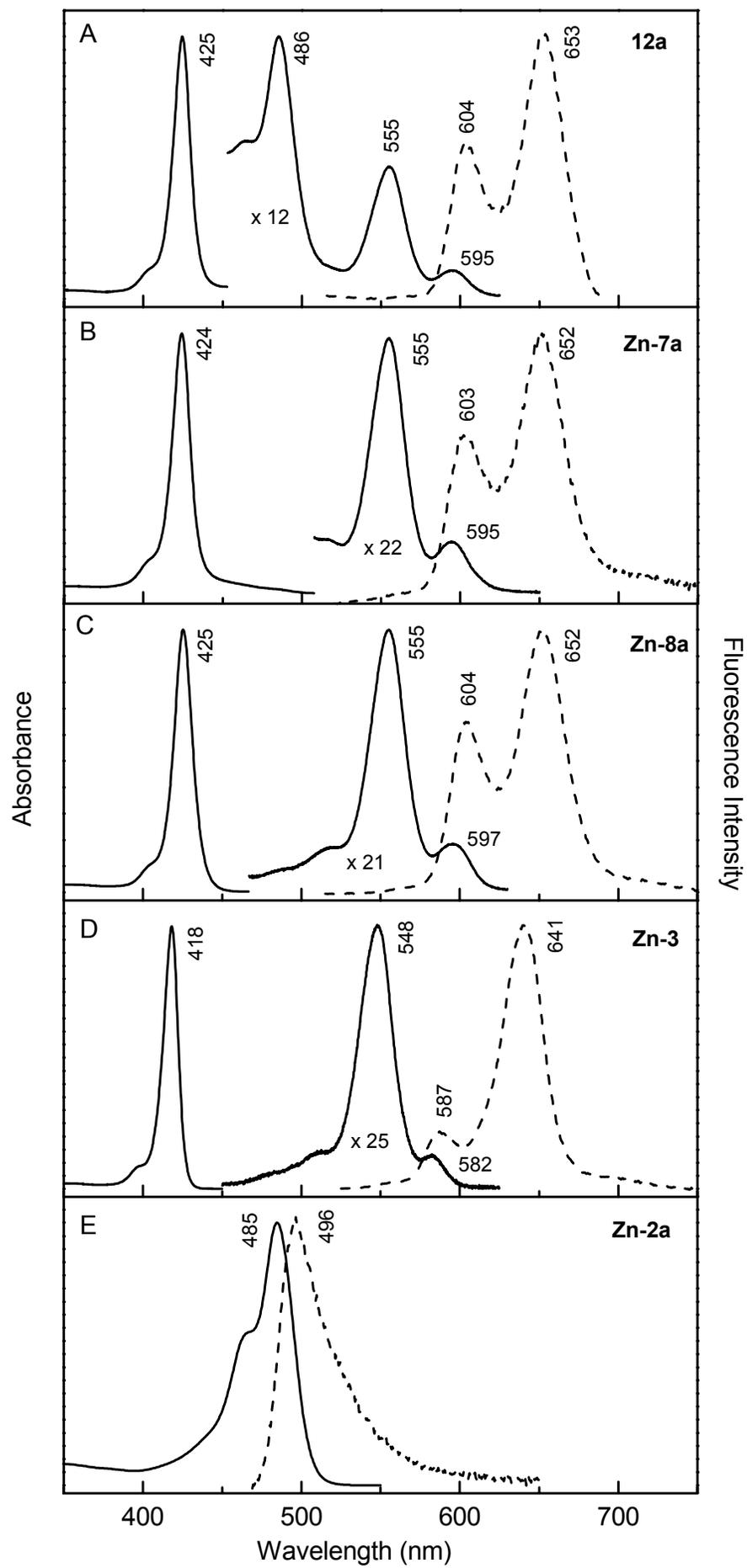
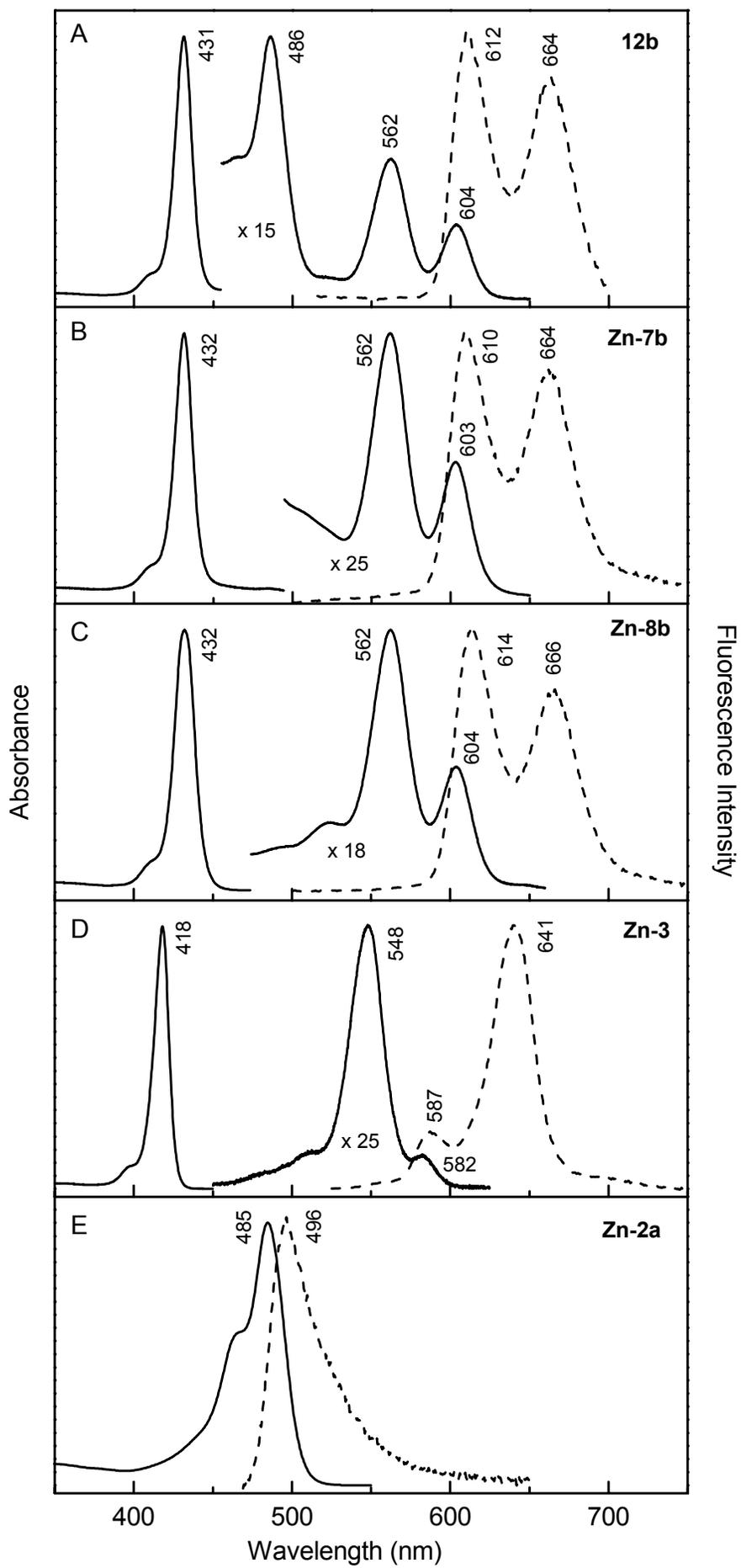
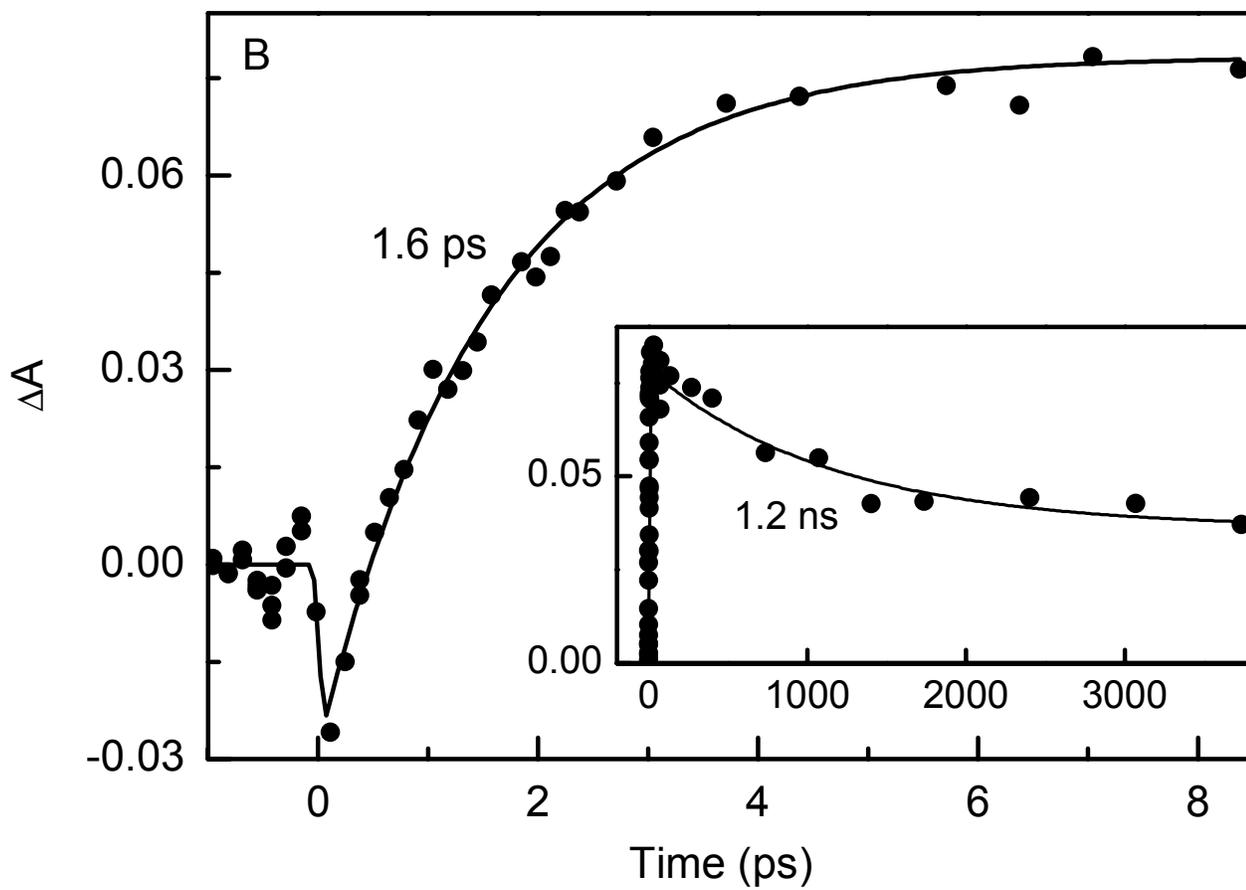
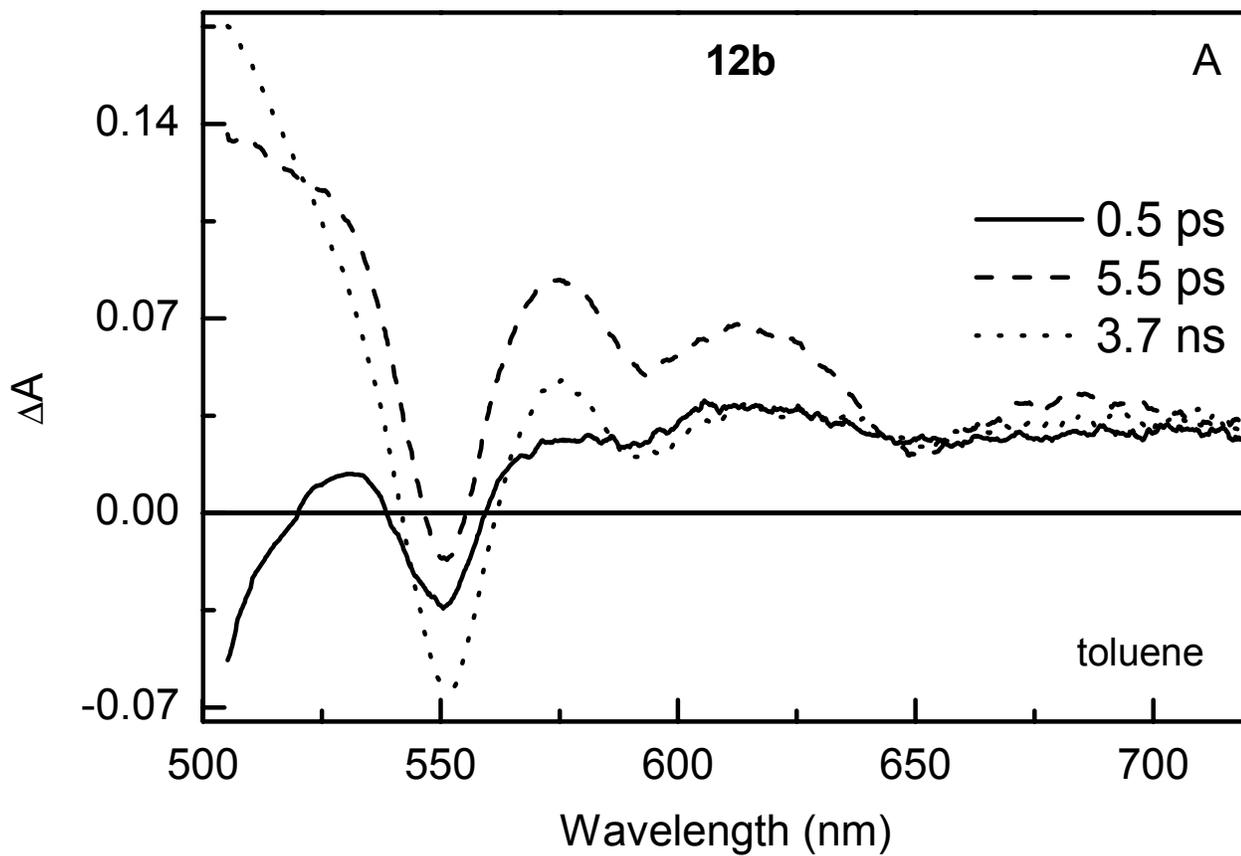


Figure SI-6



Fluorescence Intensity

Figure SI-7



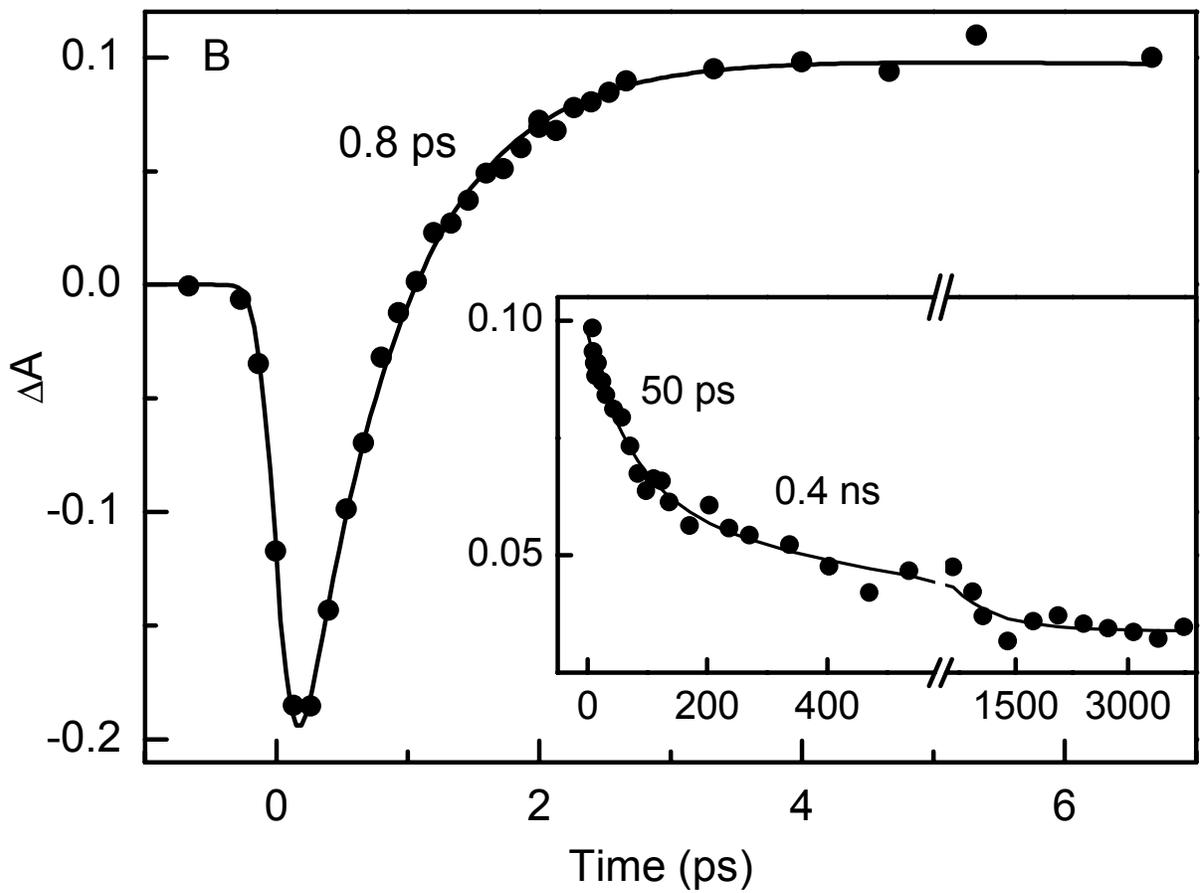
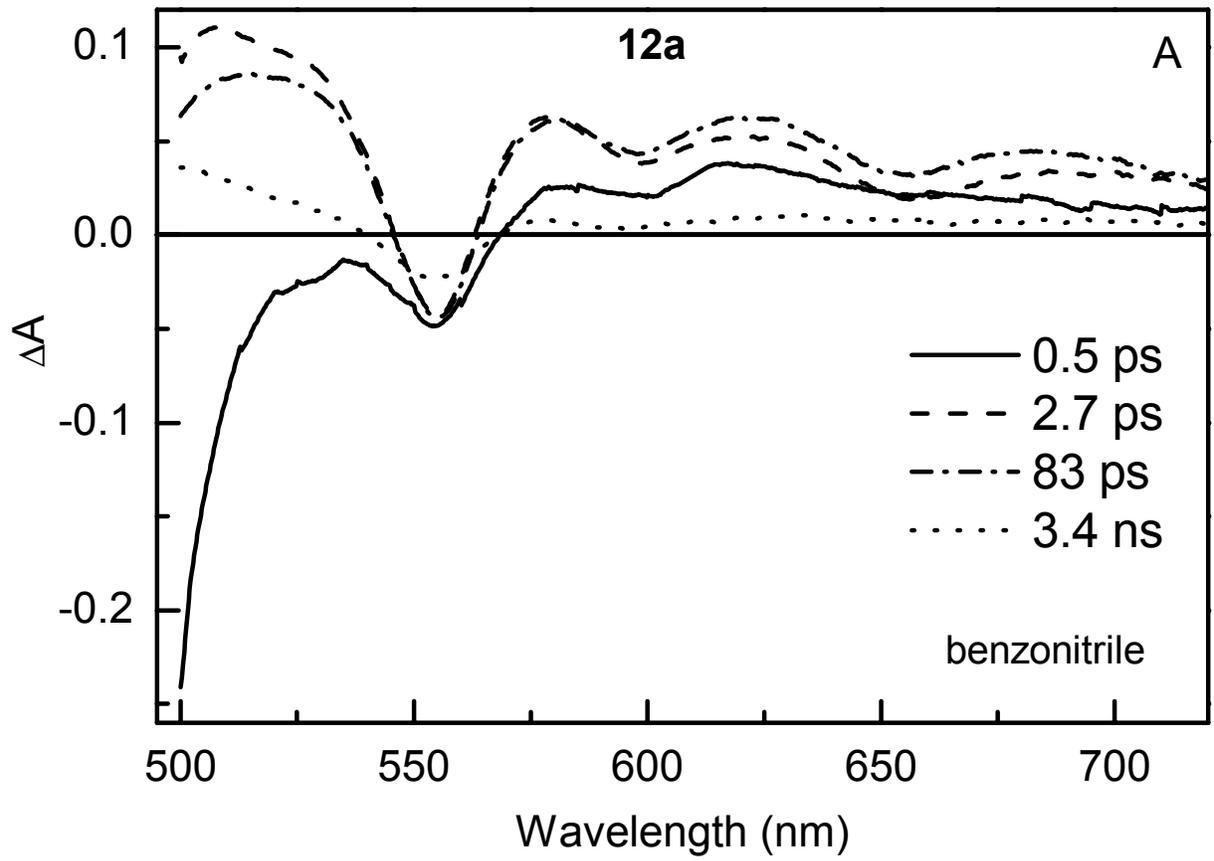


Figure SI-9

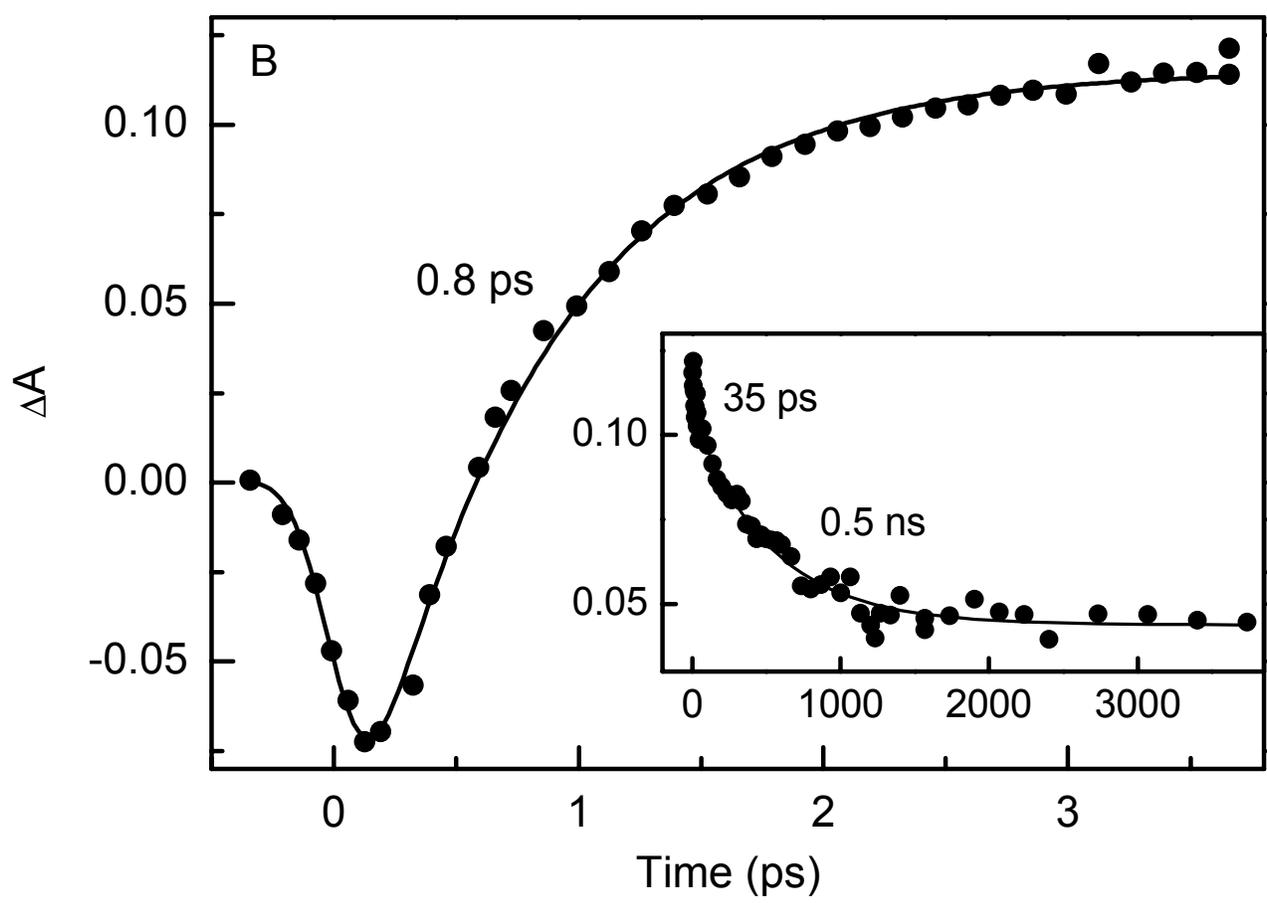
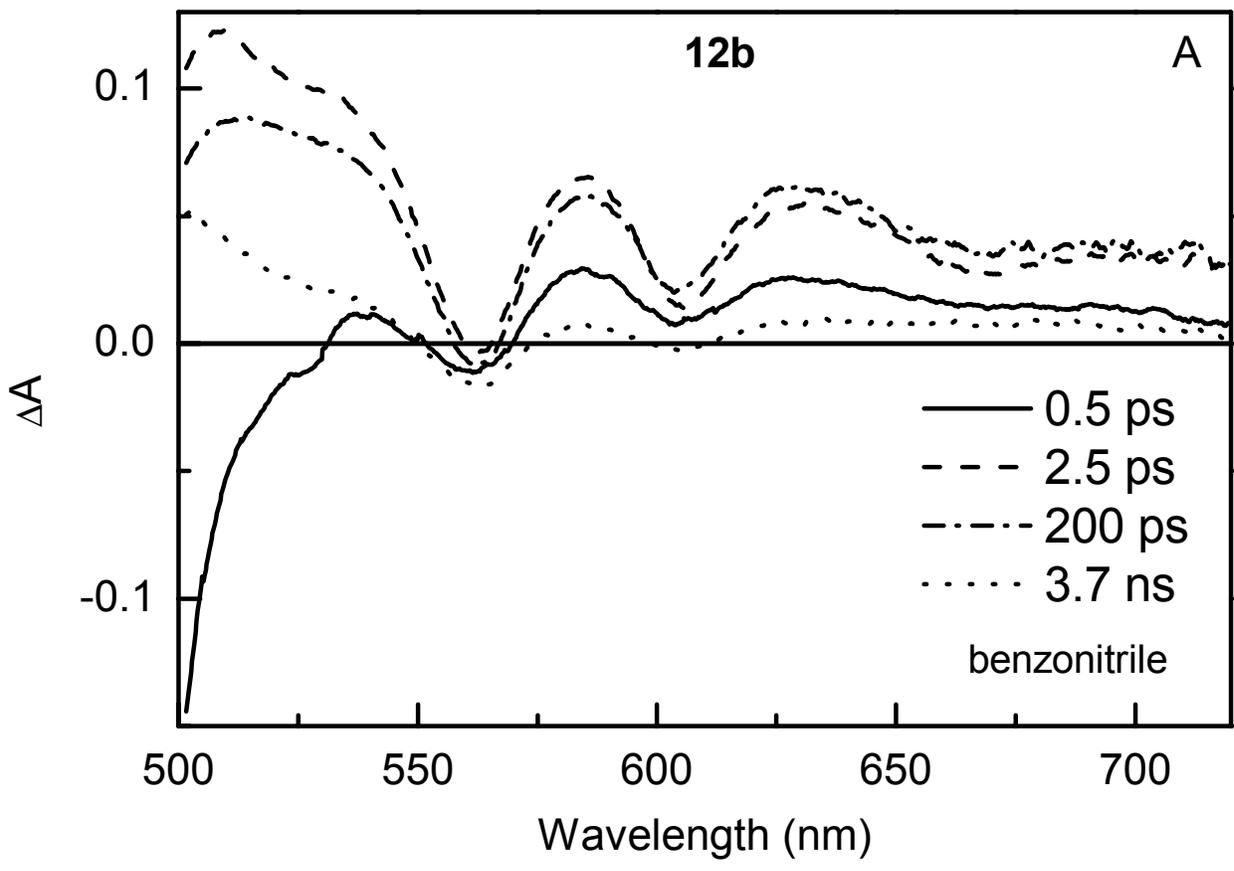
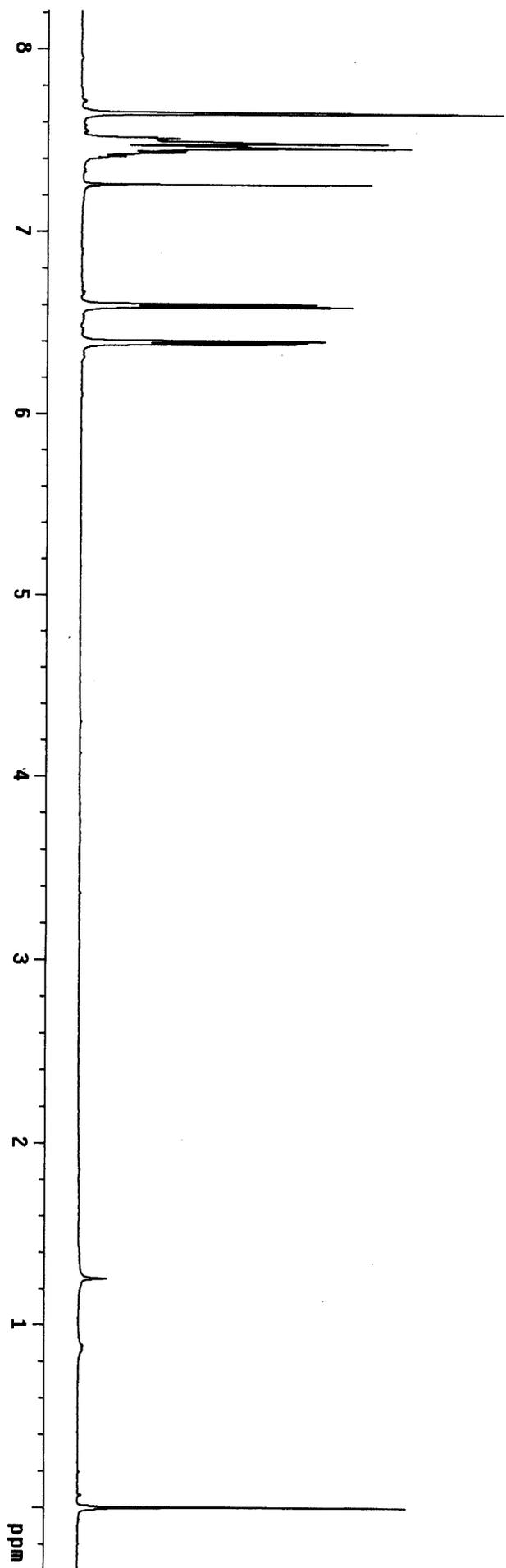
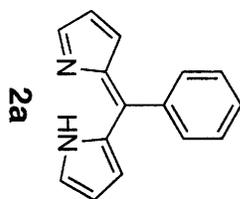
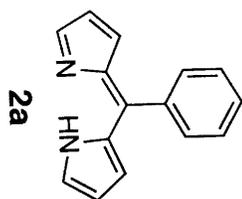
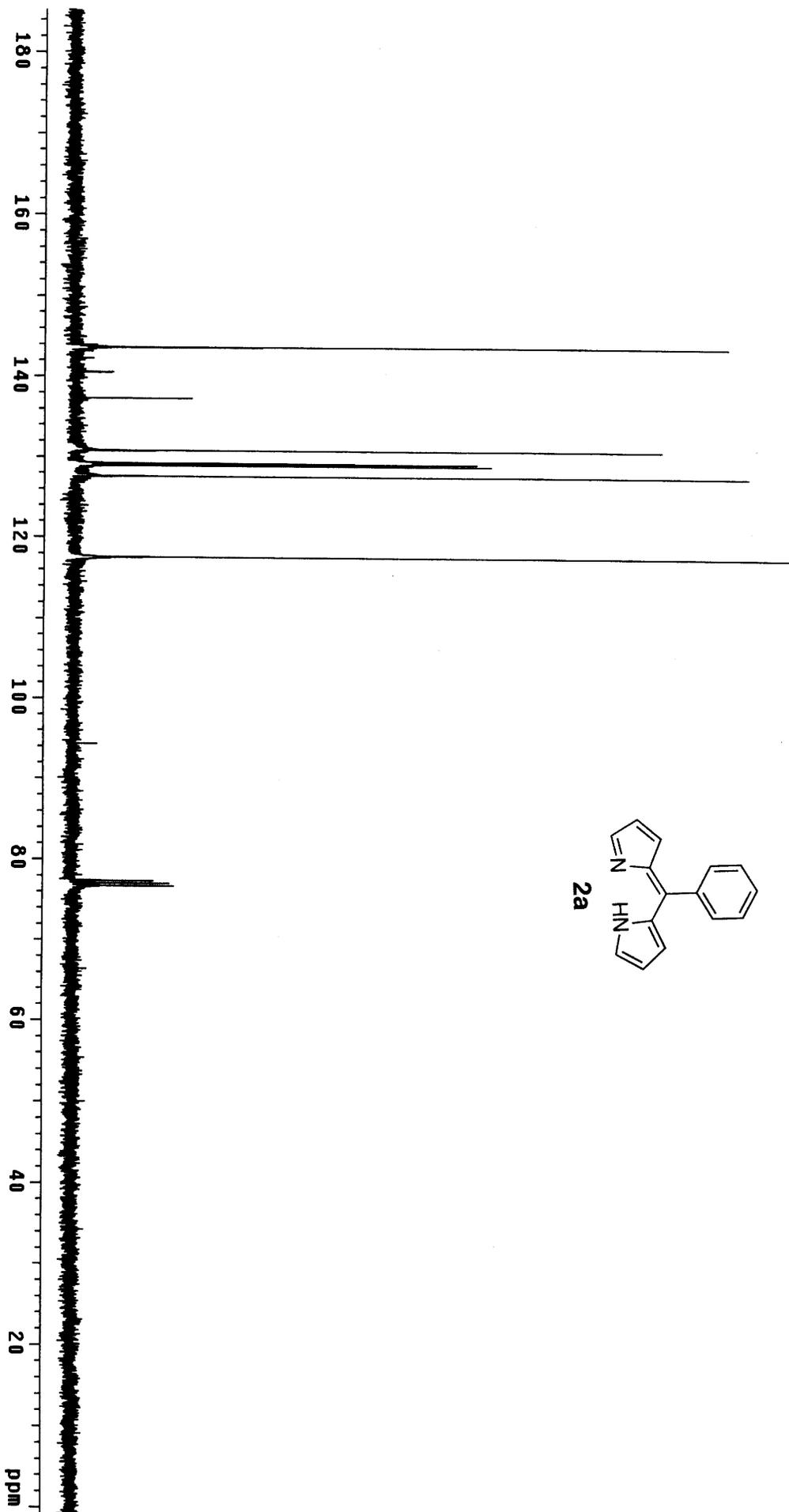
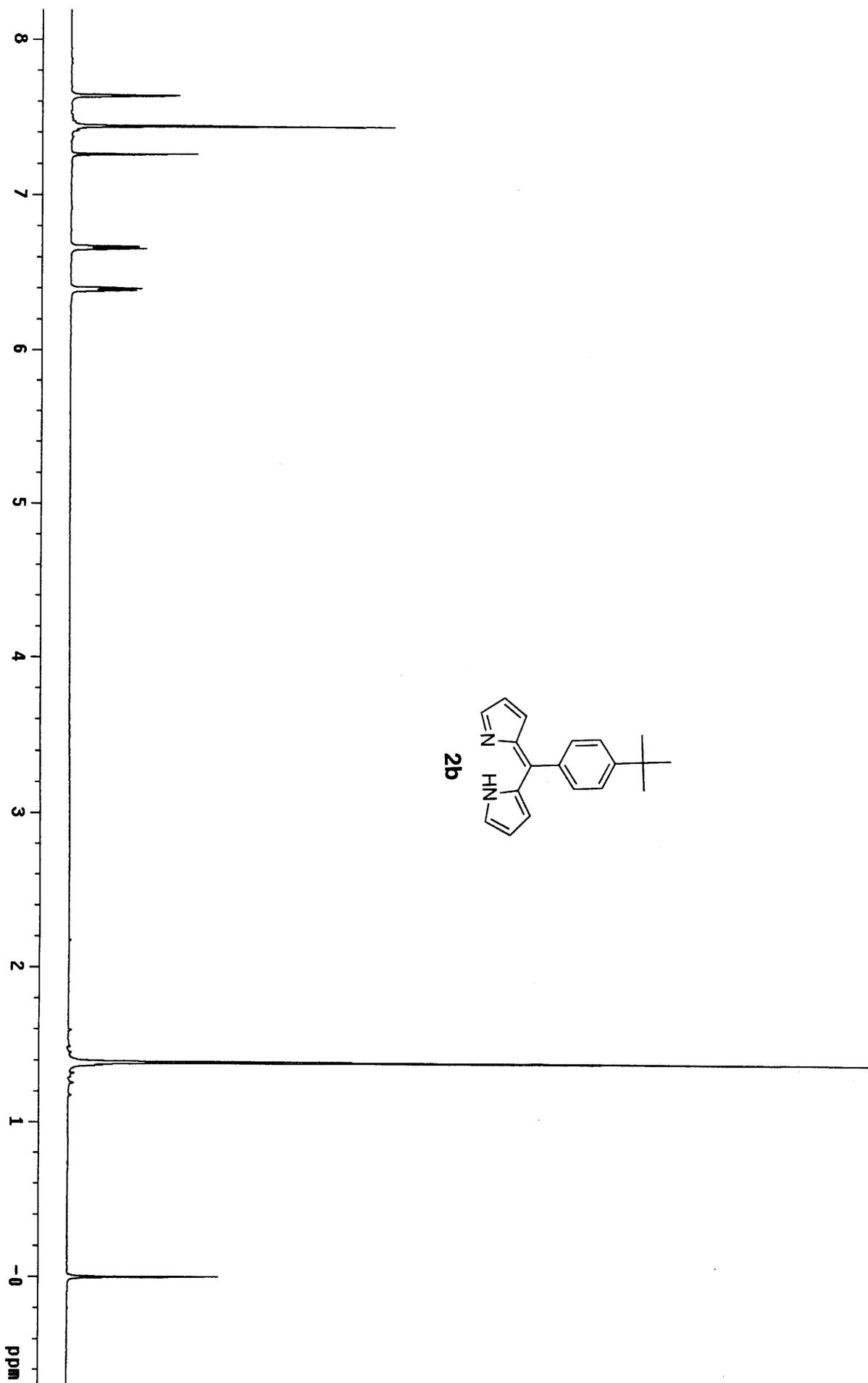
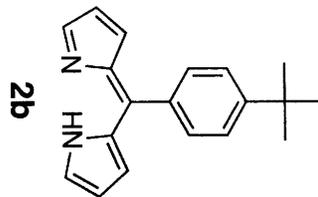
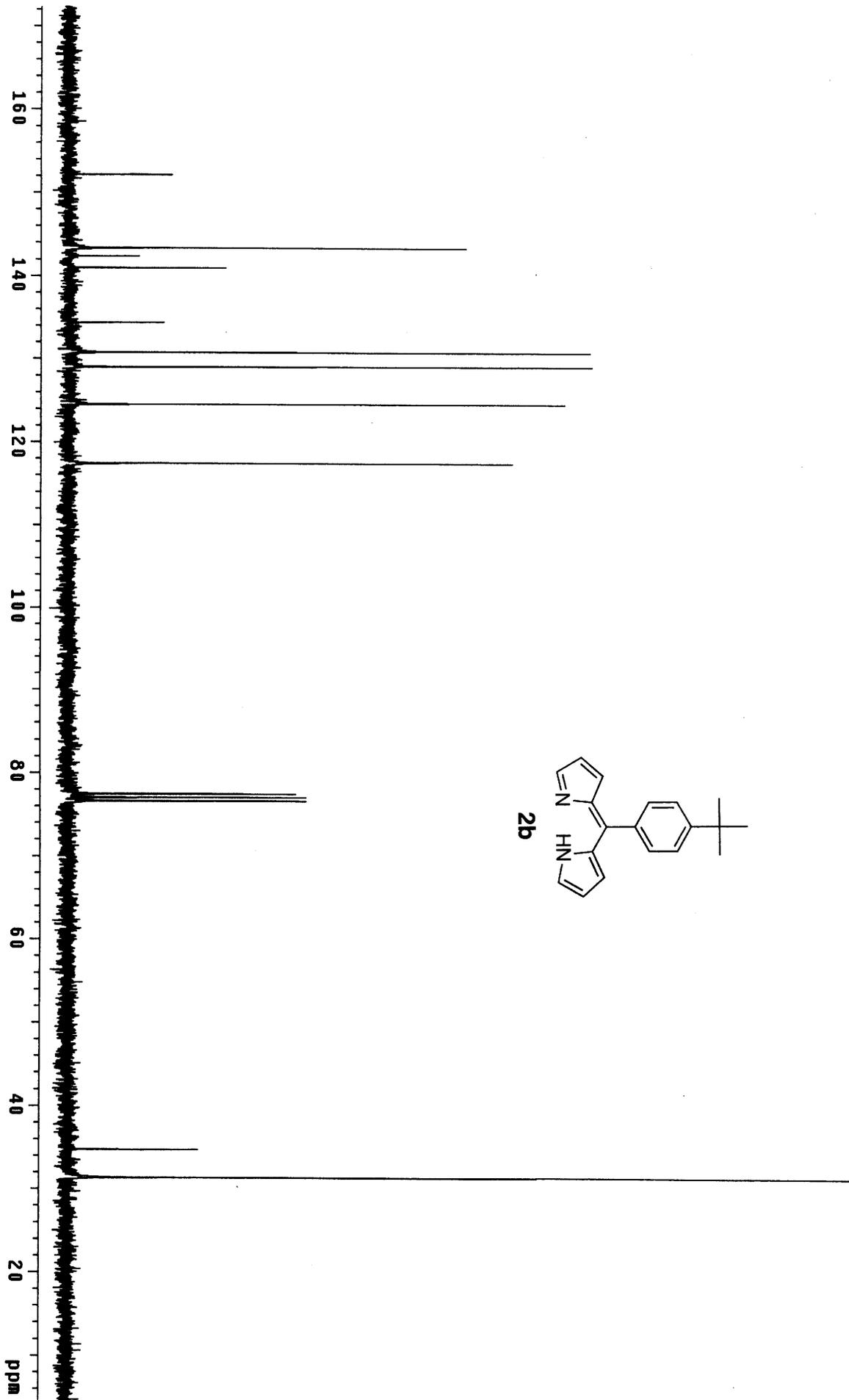


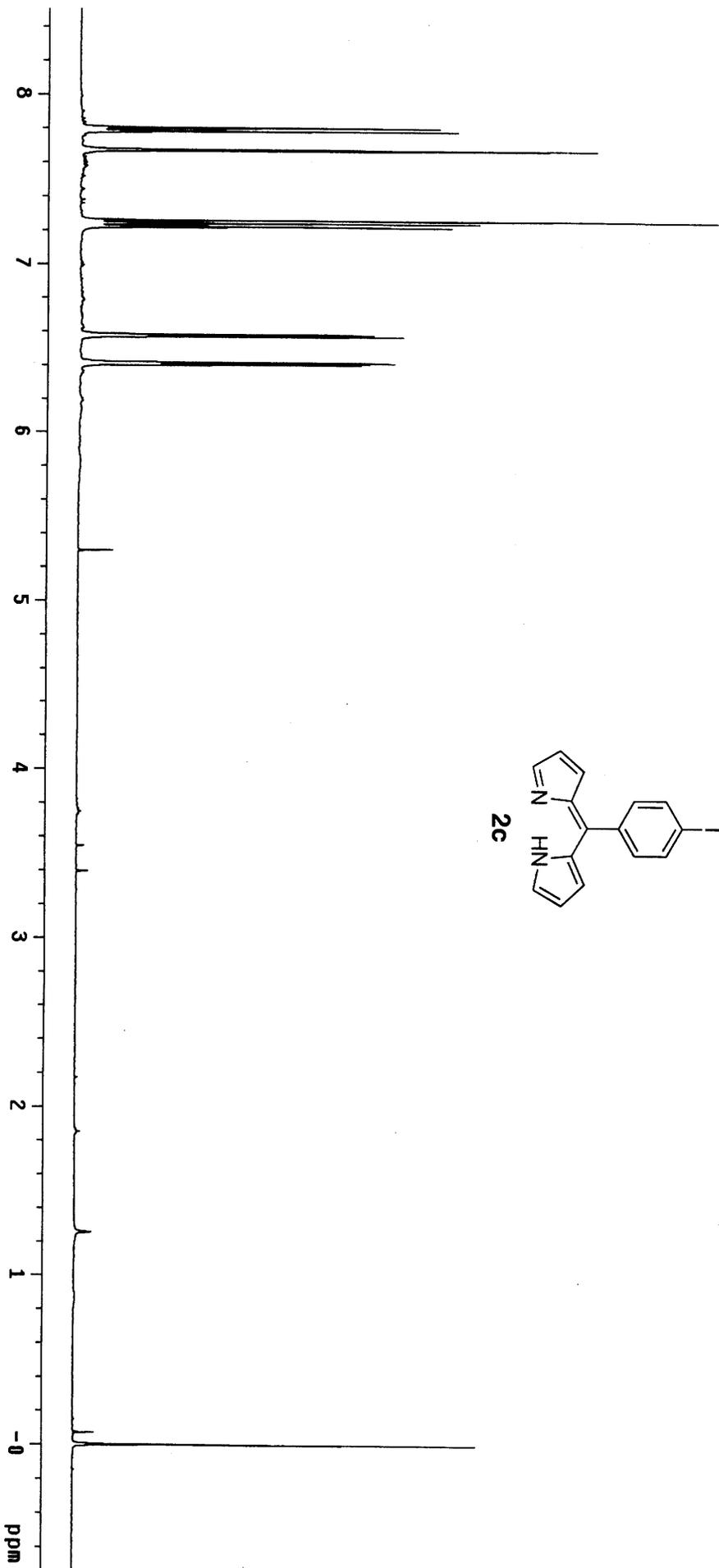
Figure SI-10

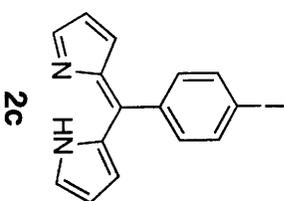
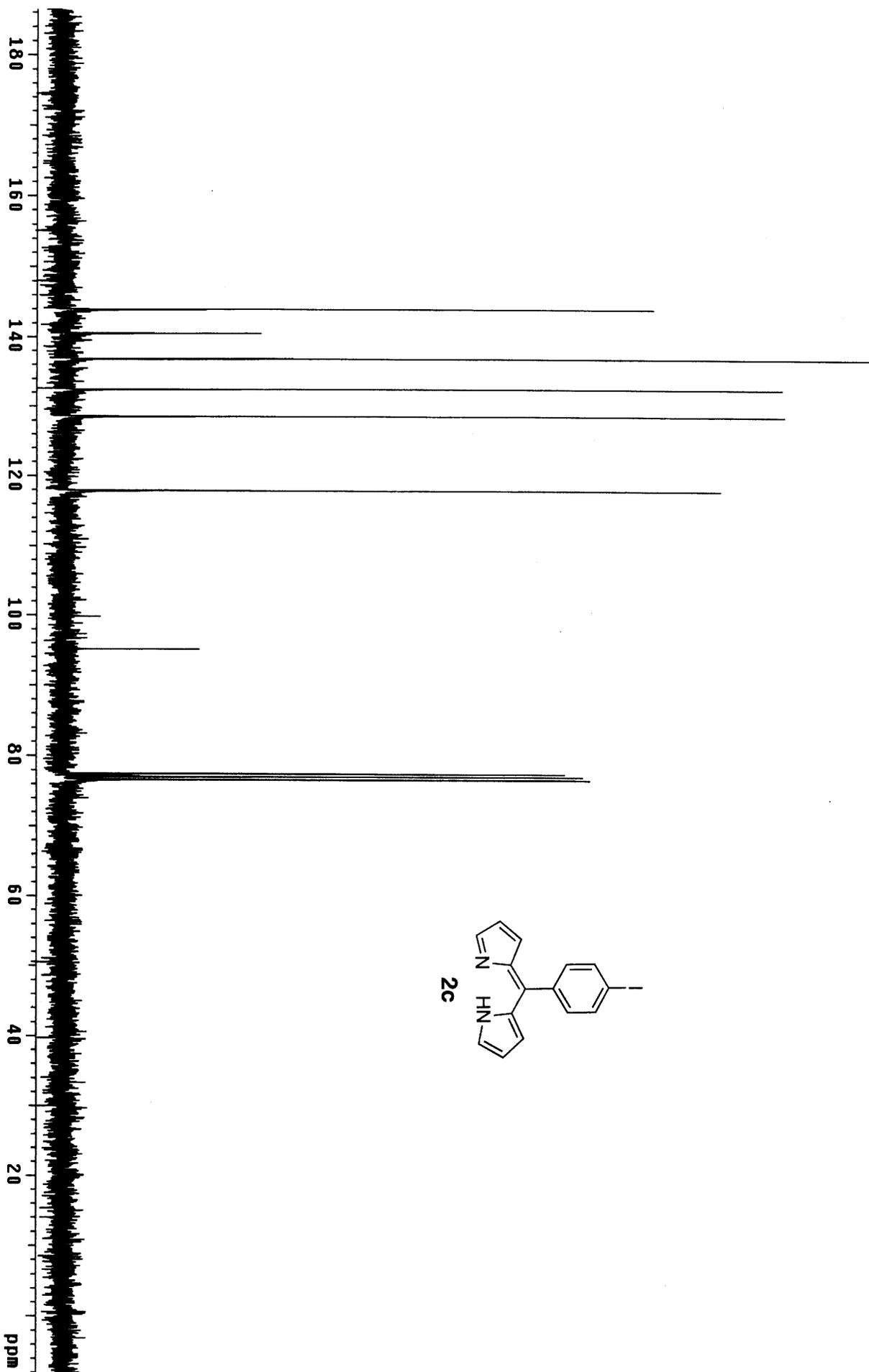


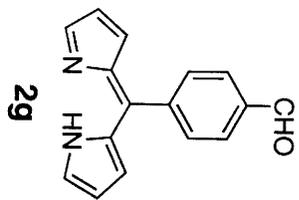
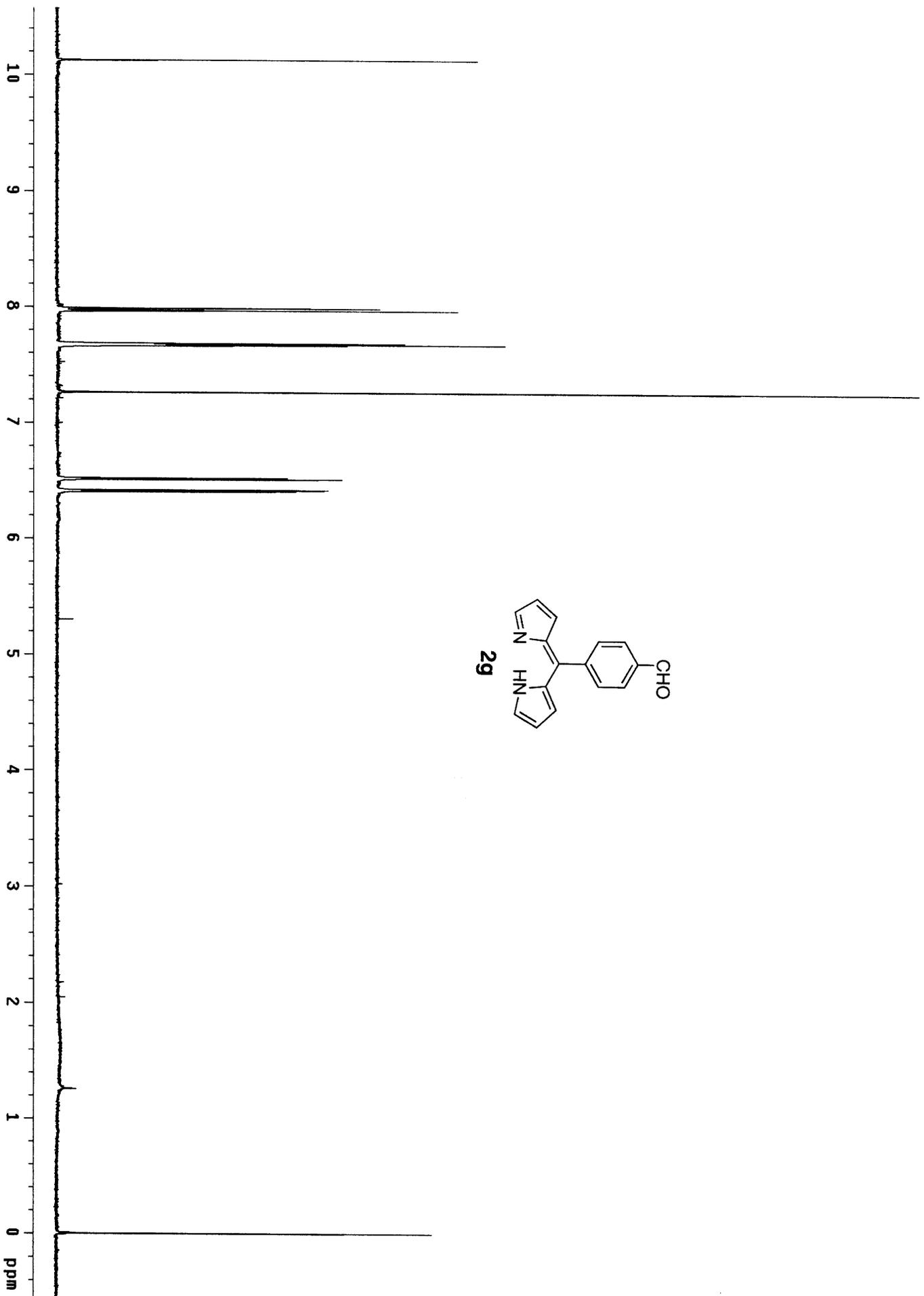


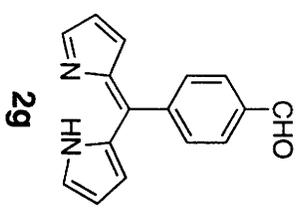
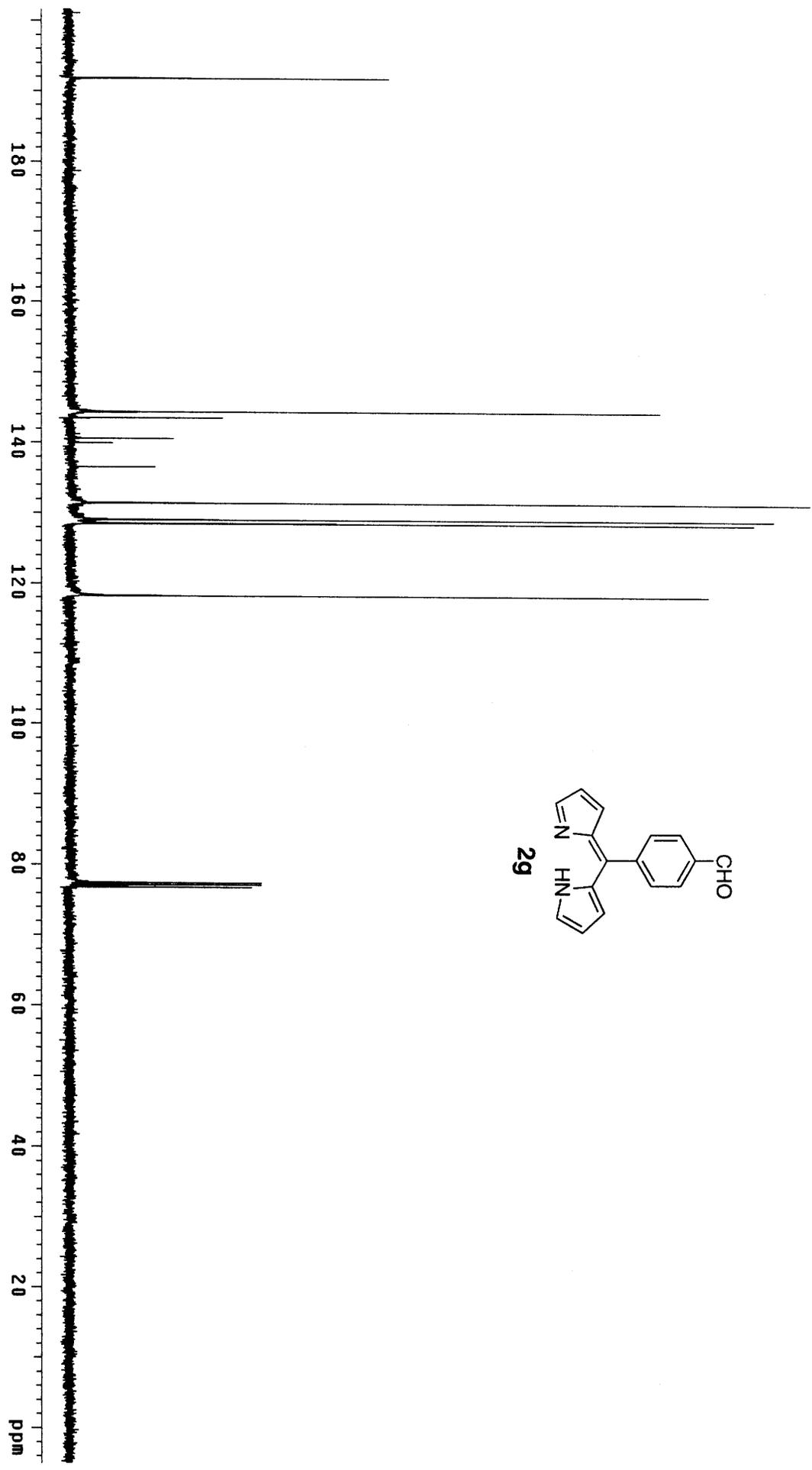


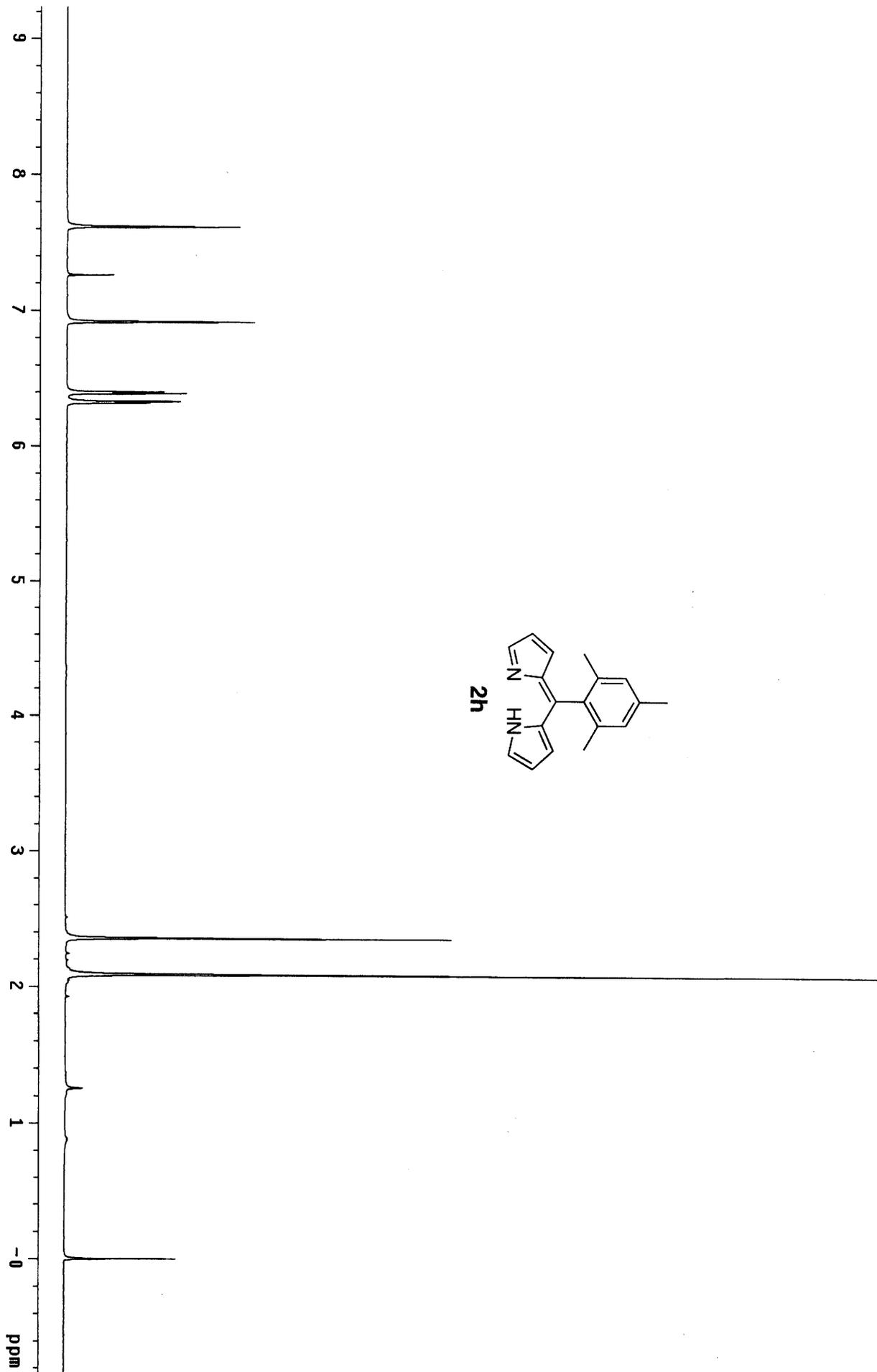


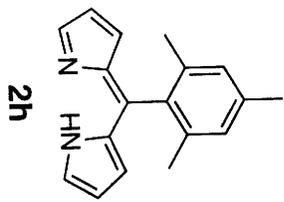
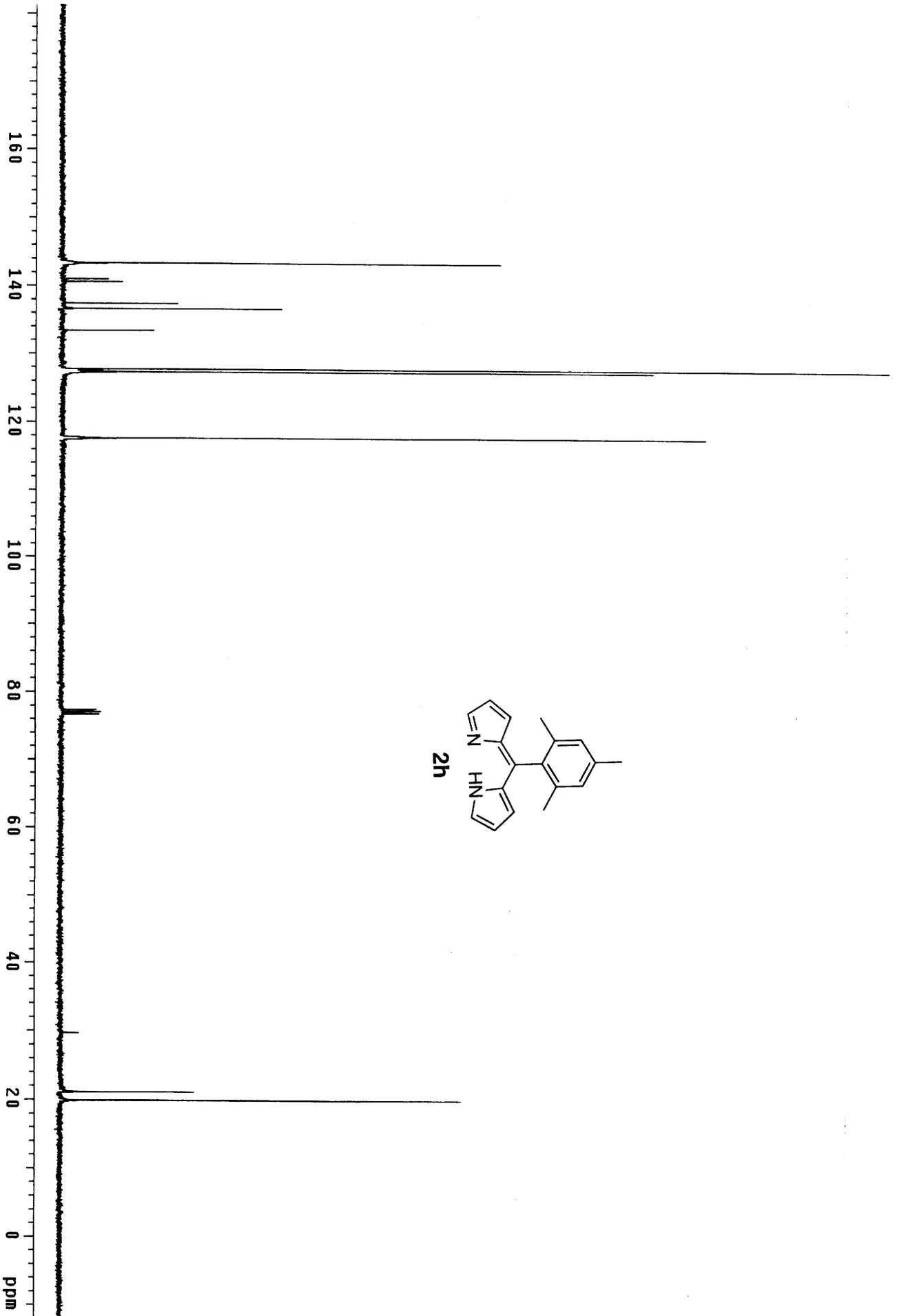


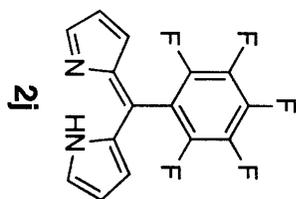
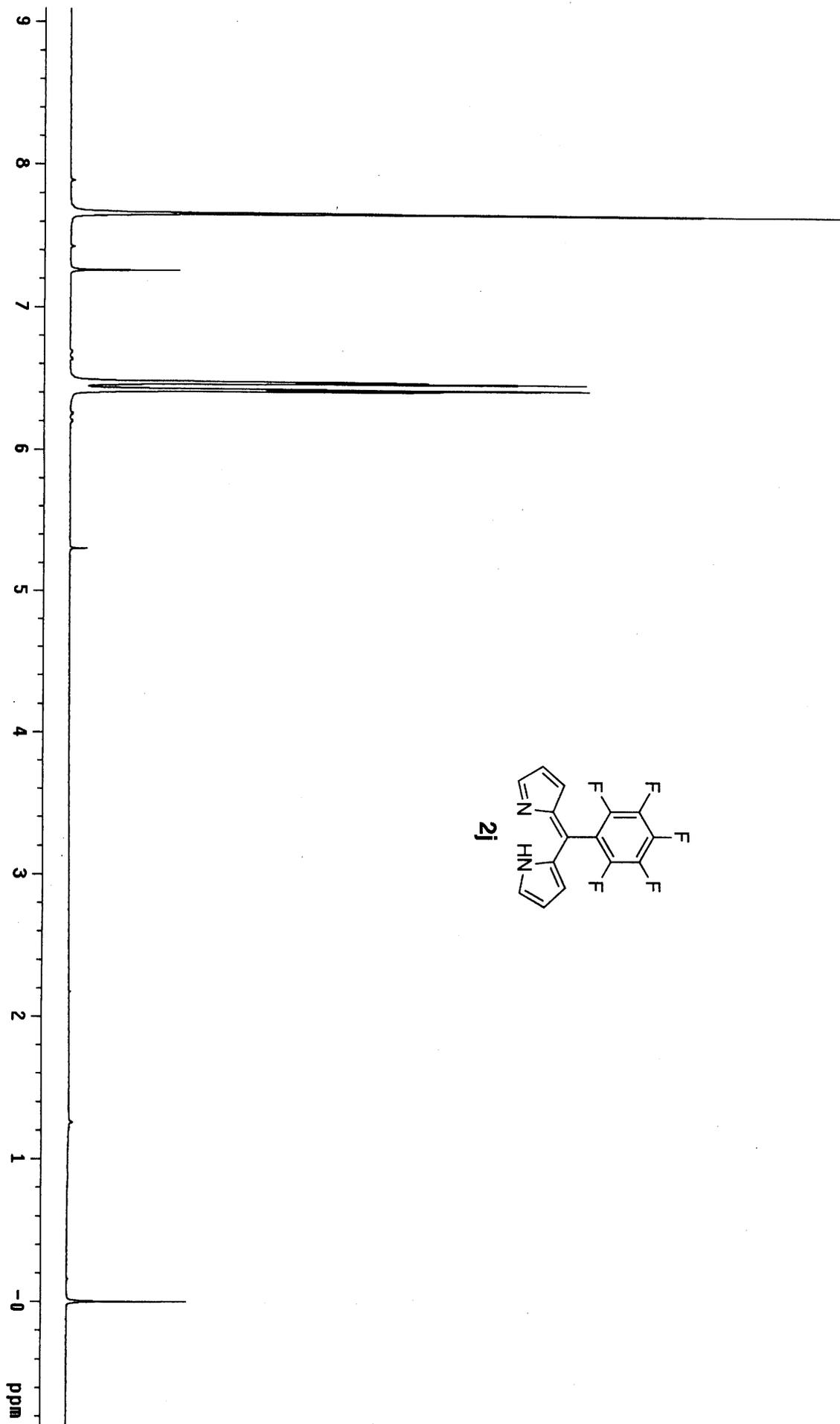


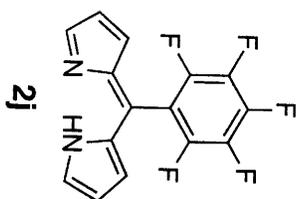
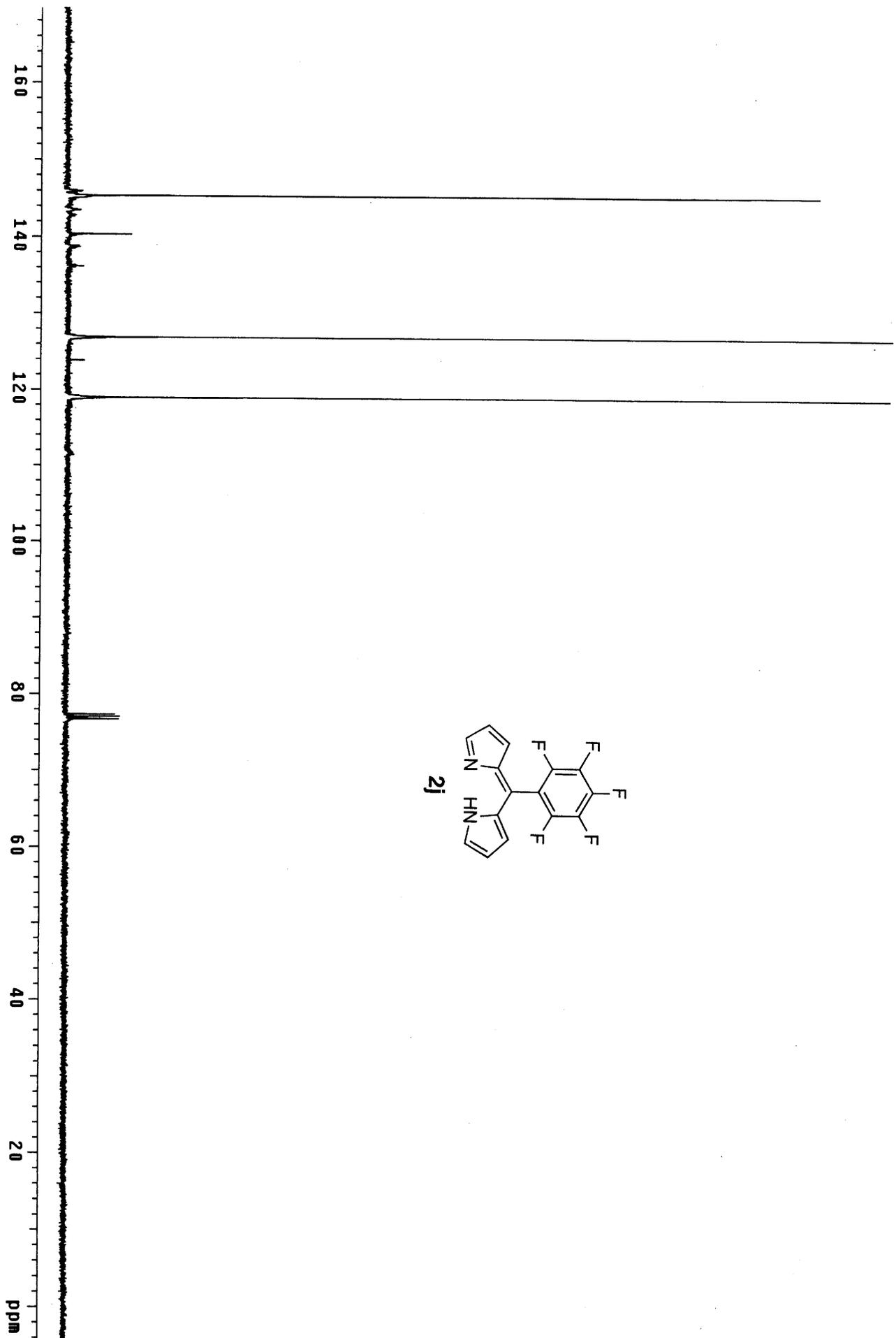


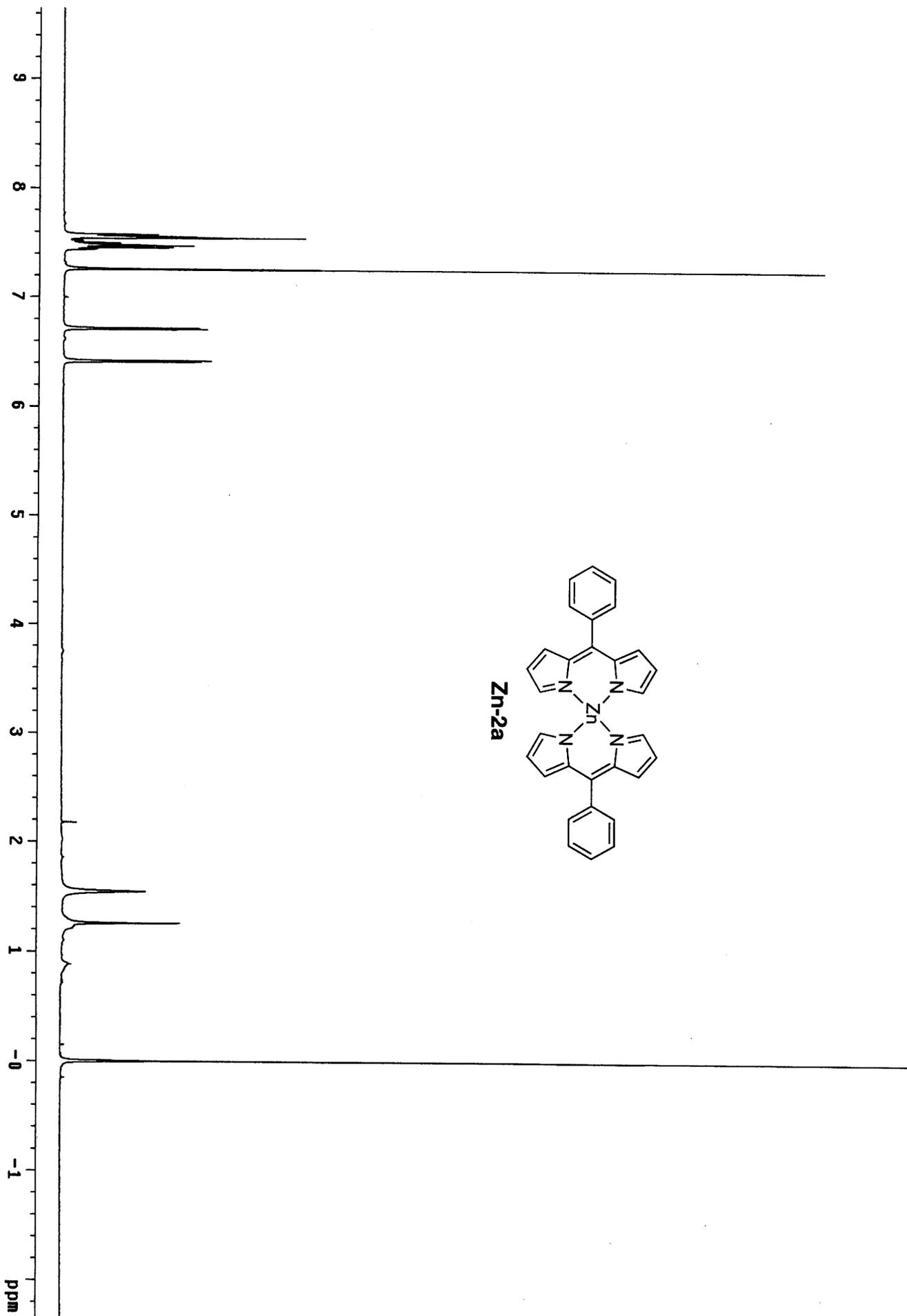


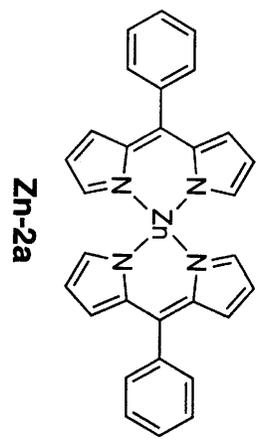
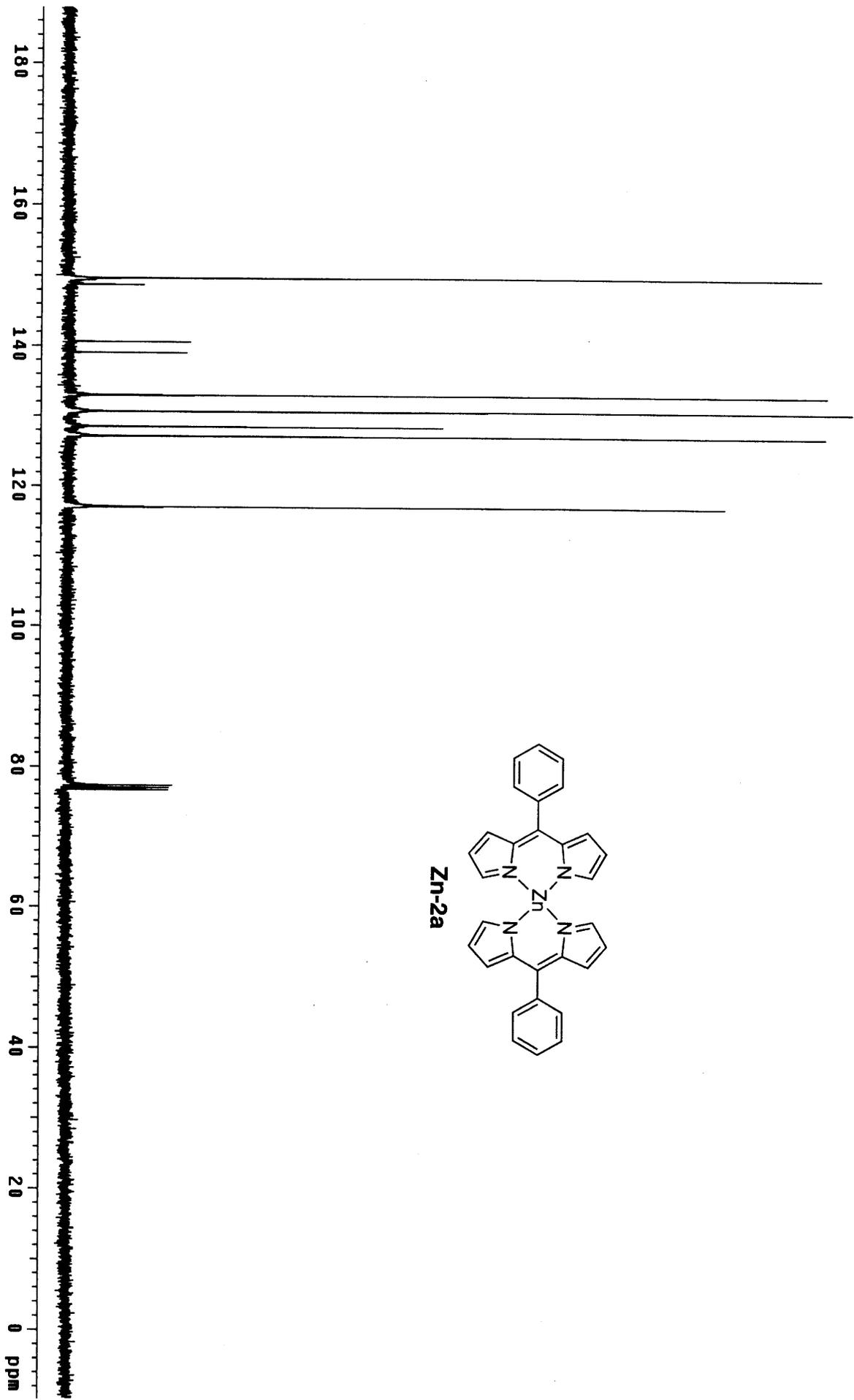


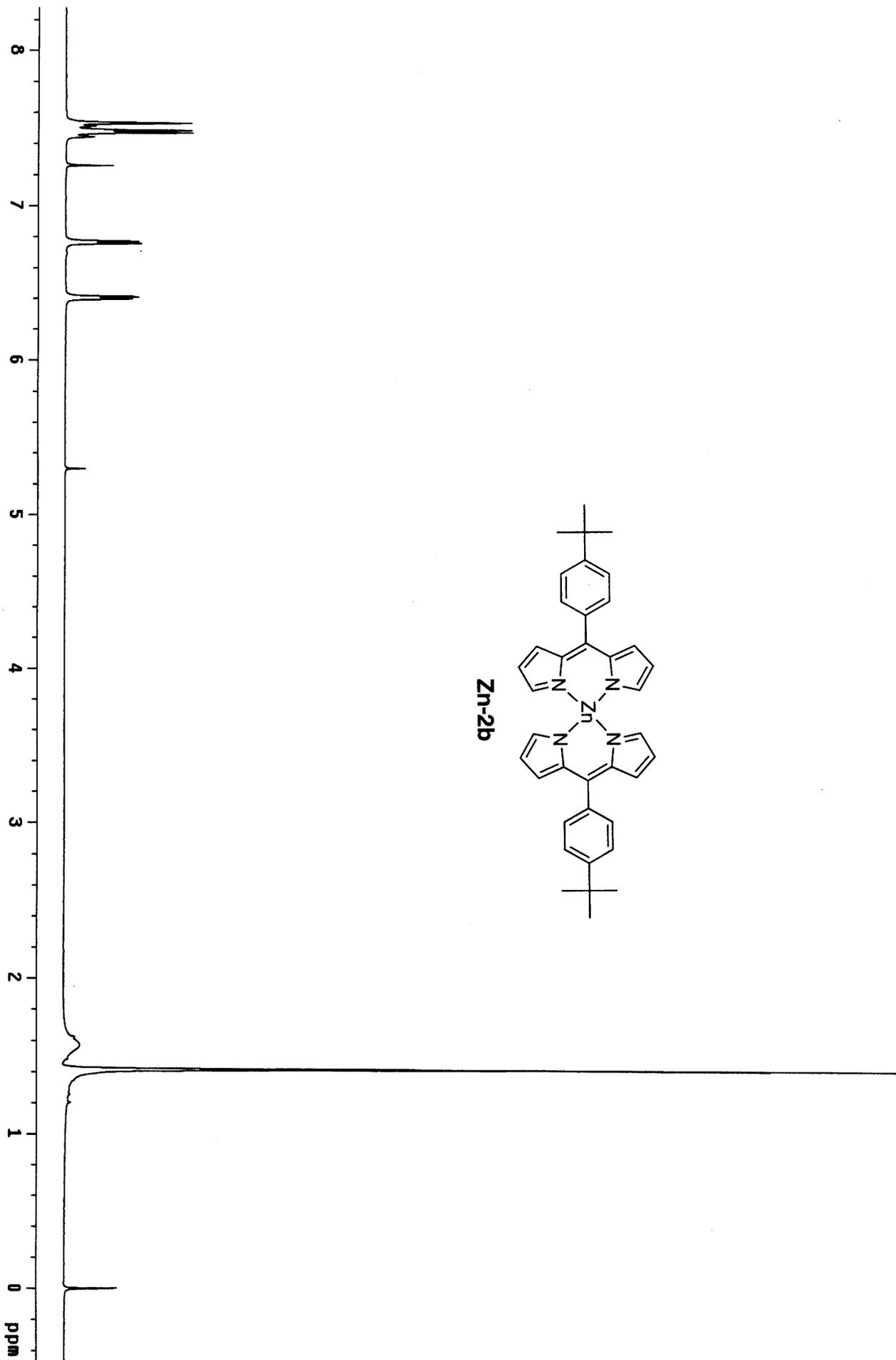
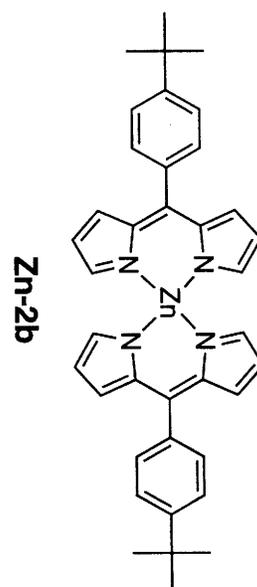


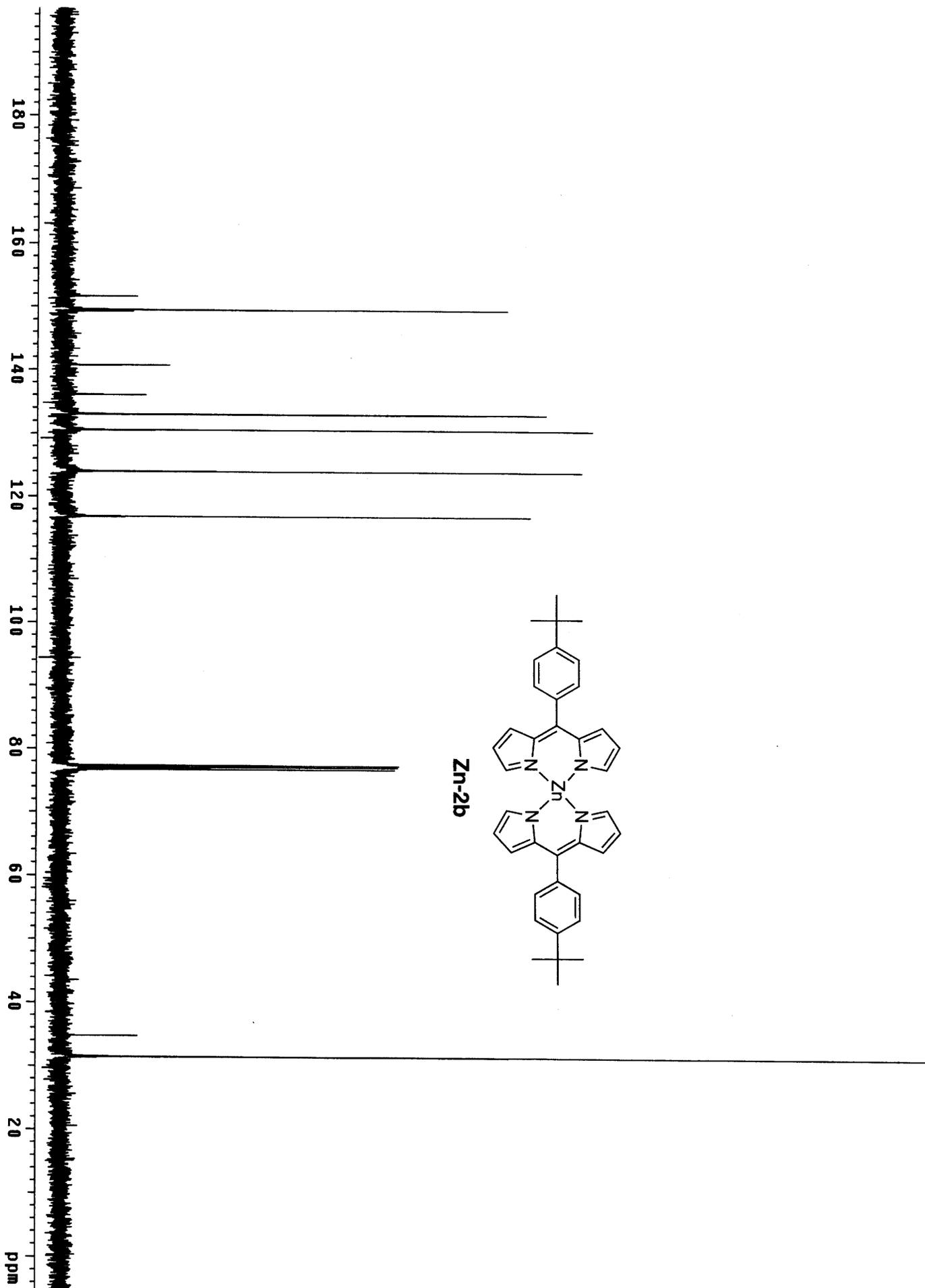


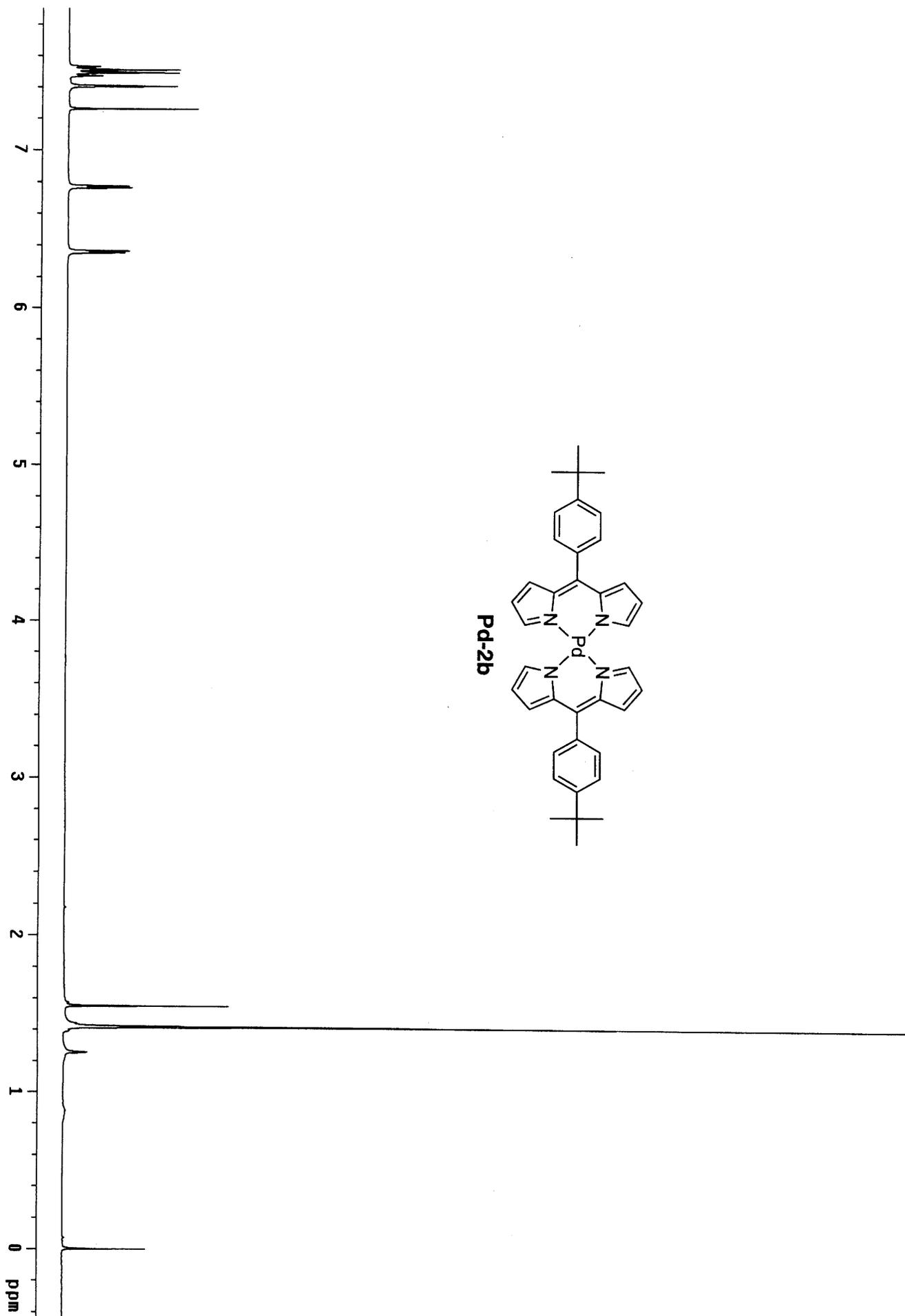
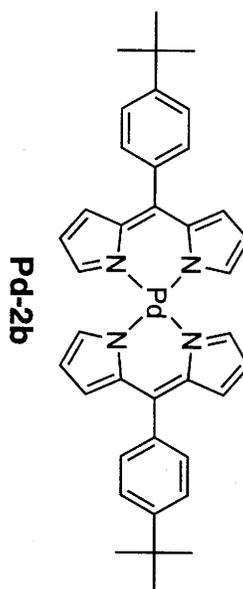


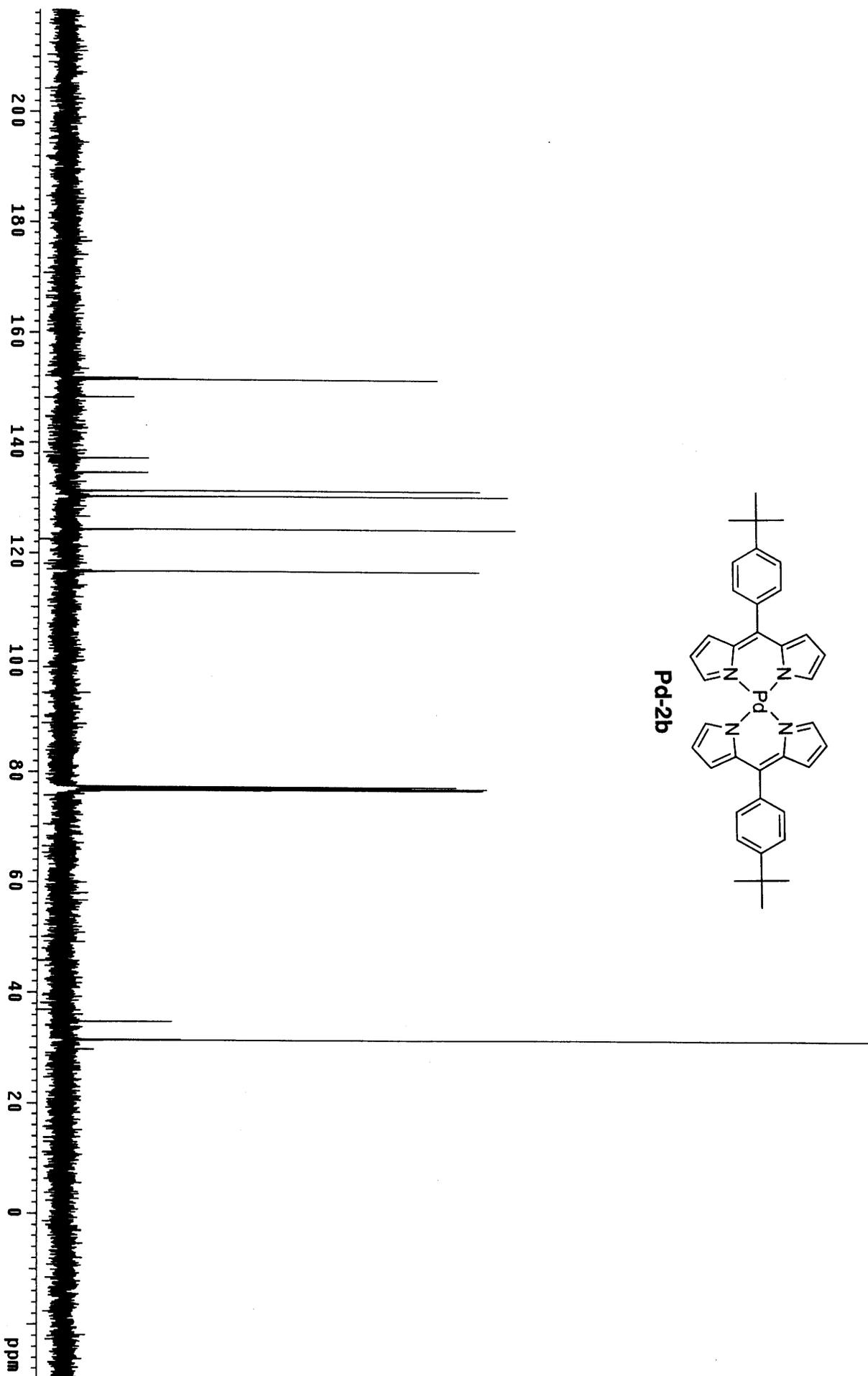
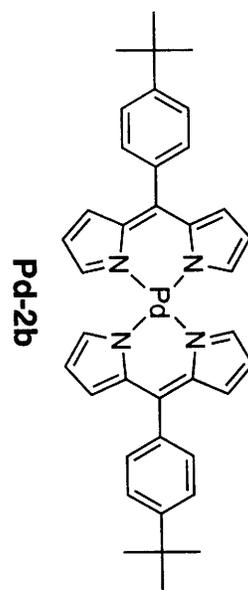


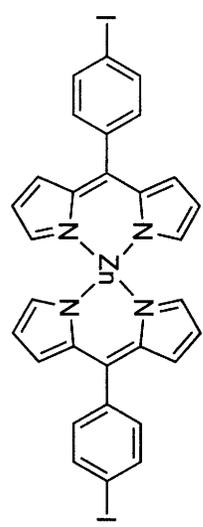
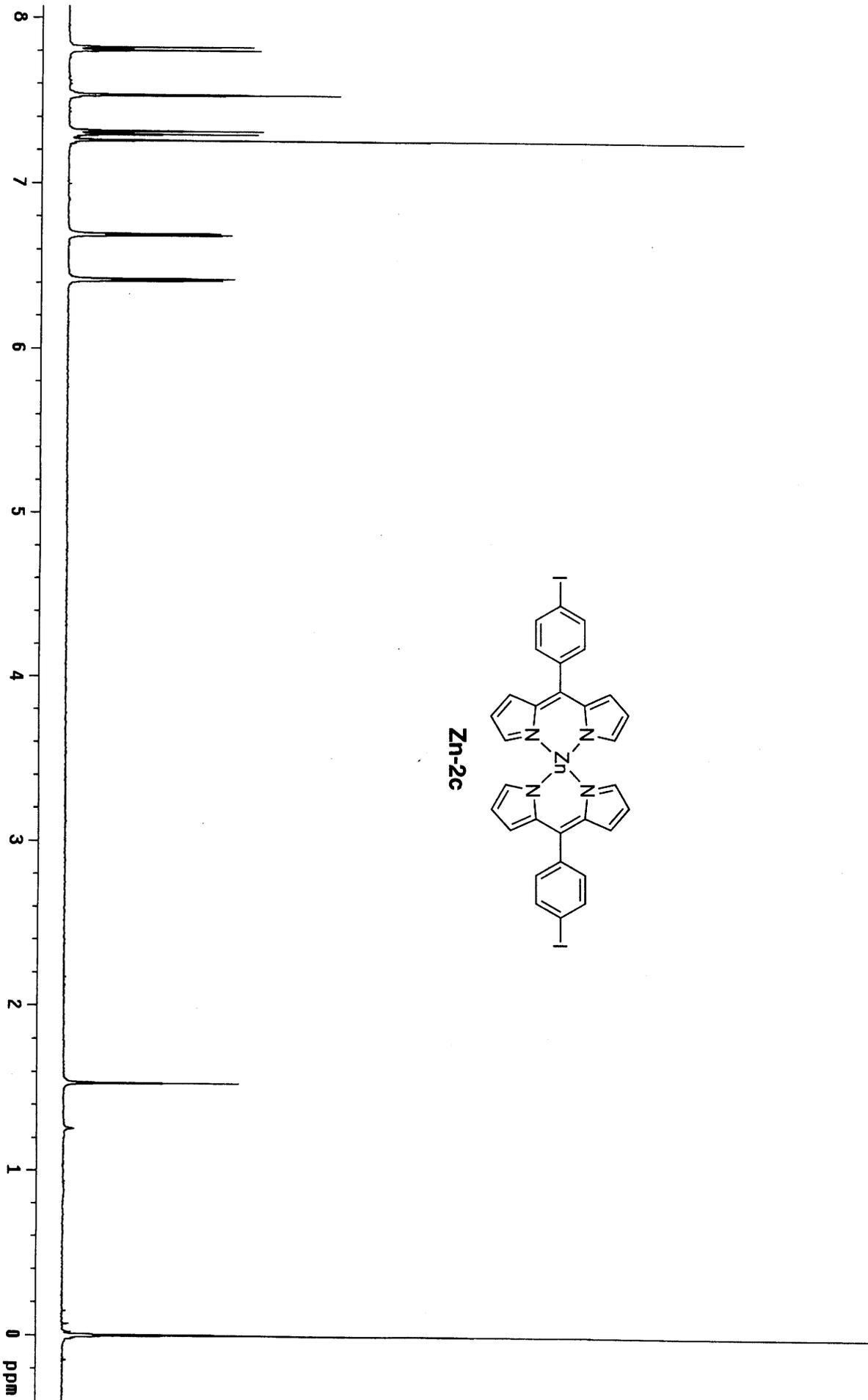


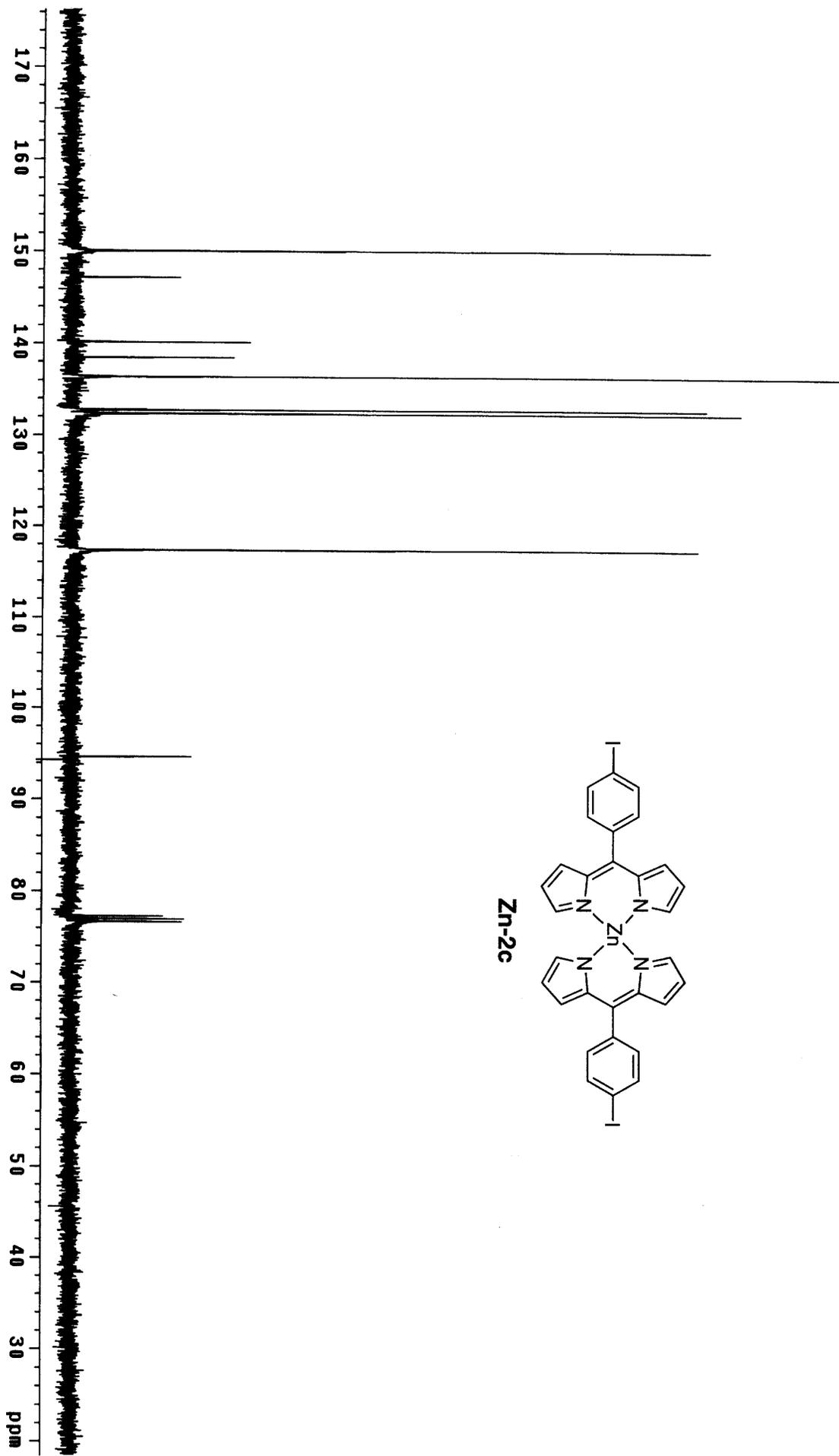




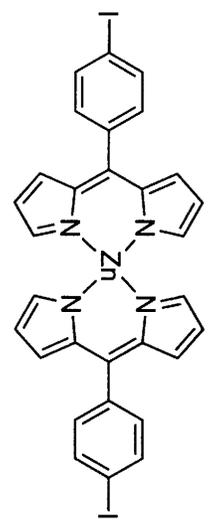


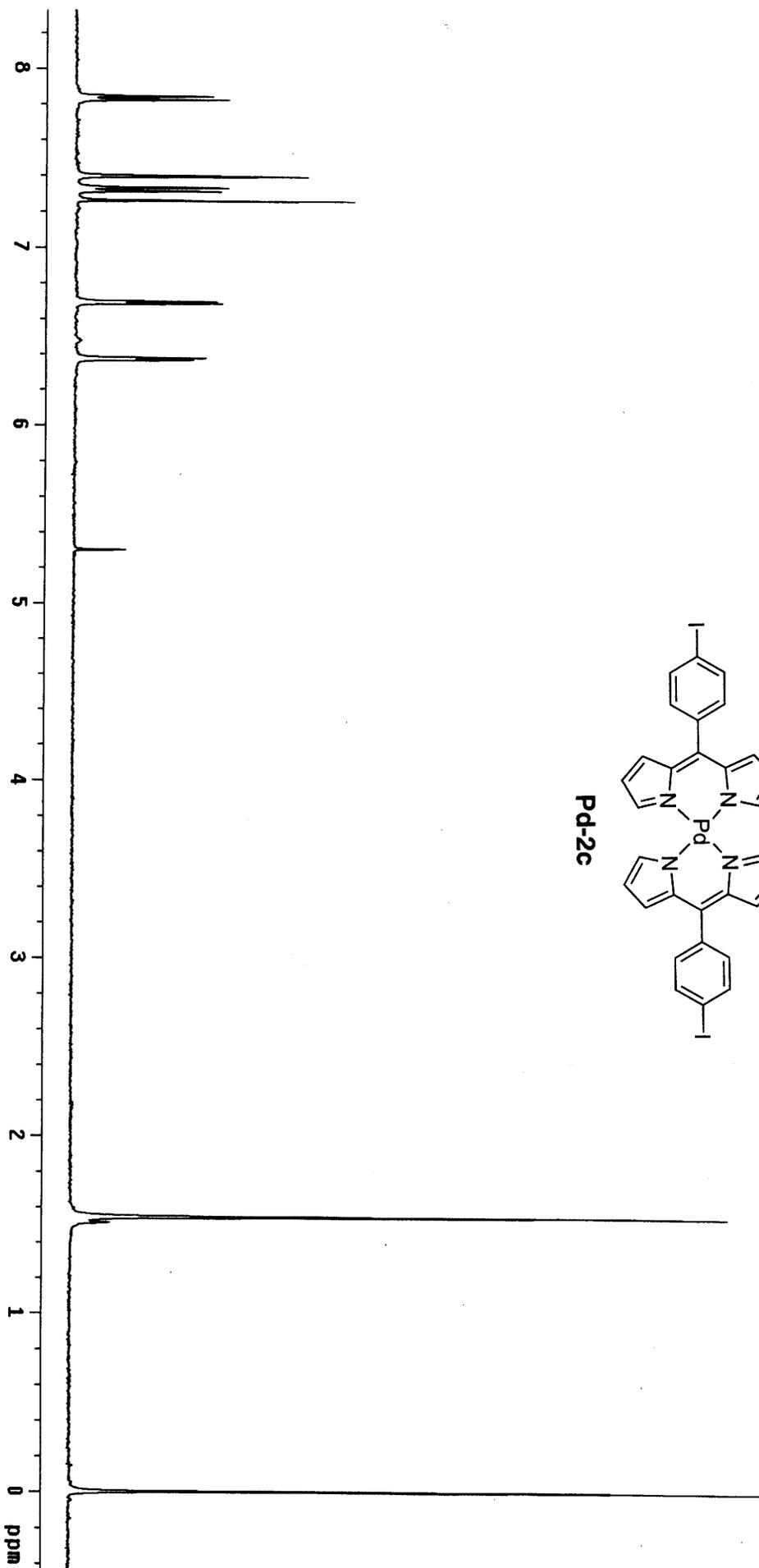
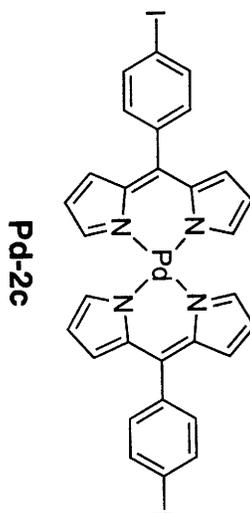


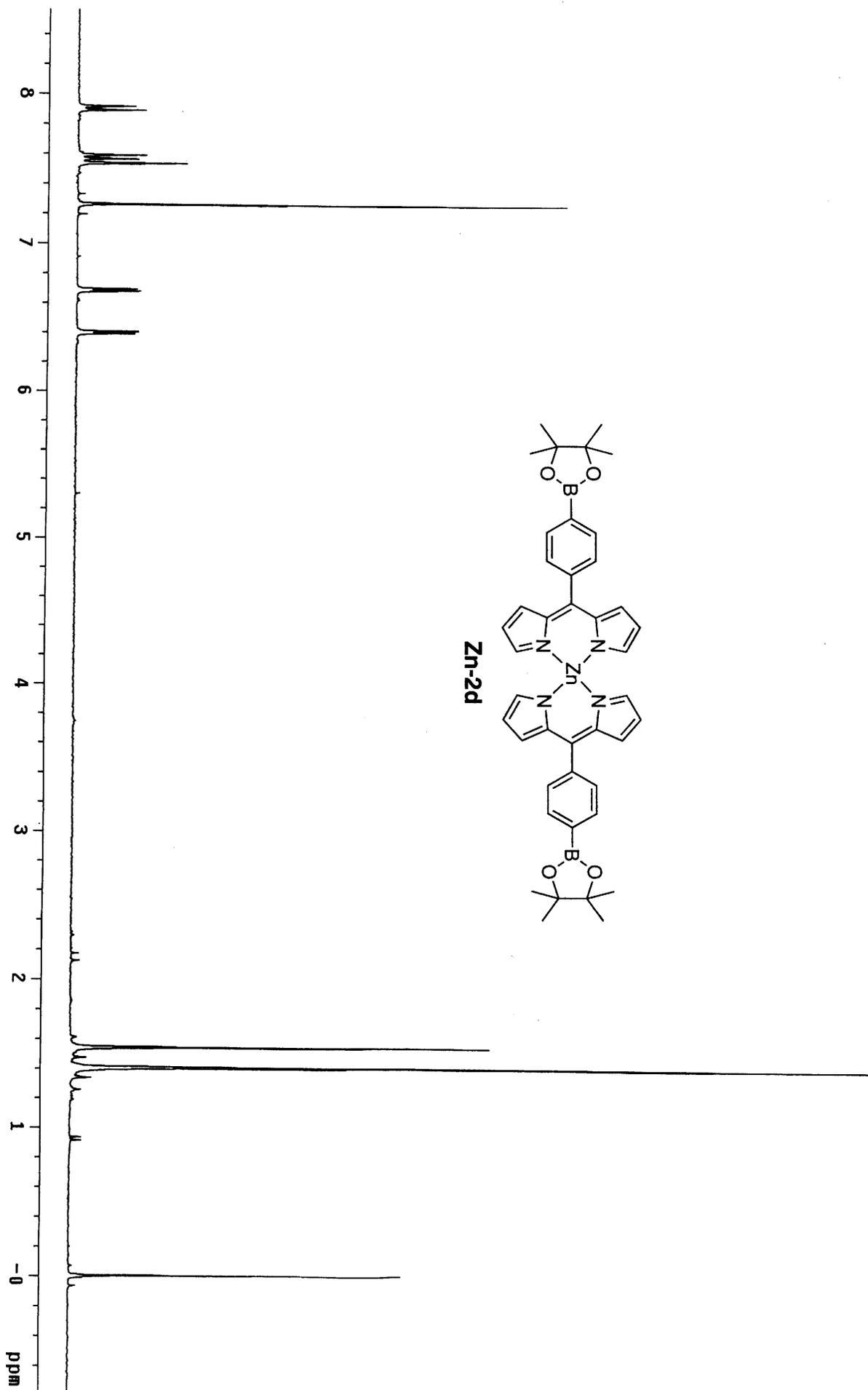


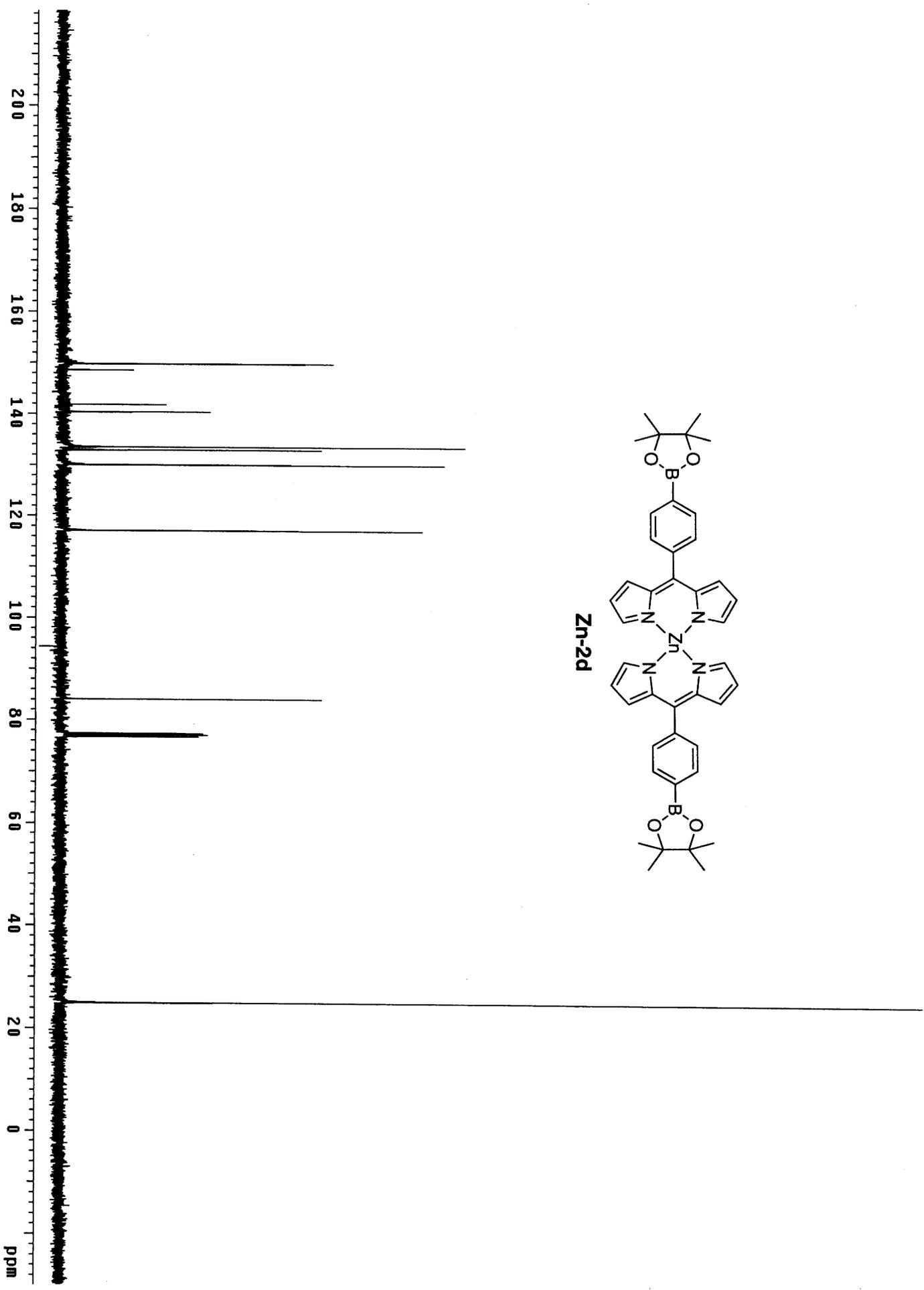
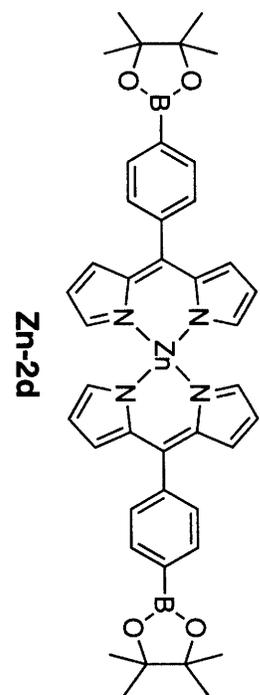


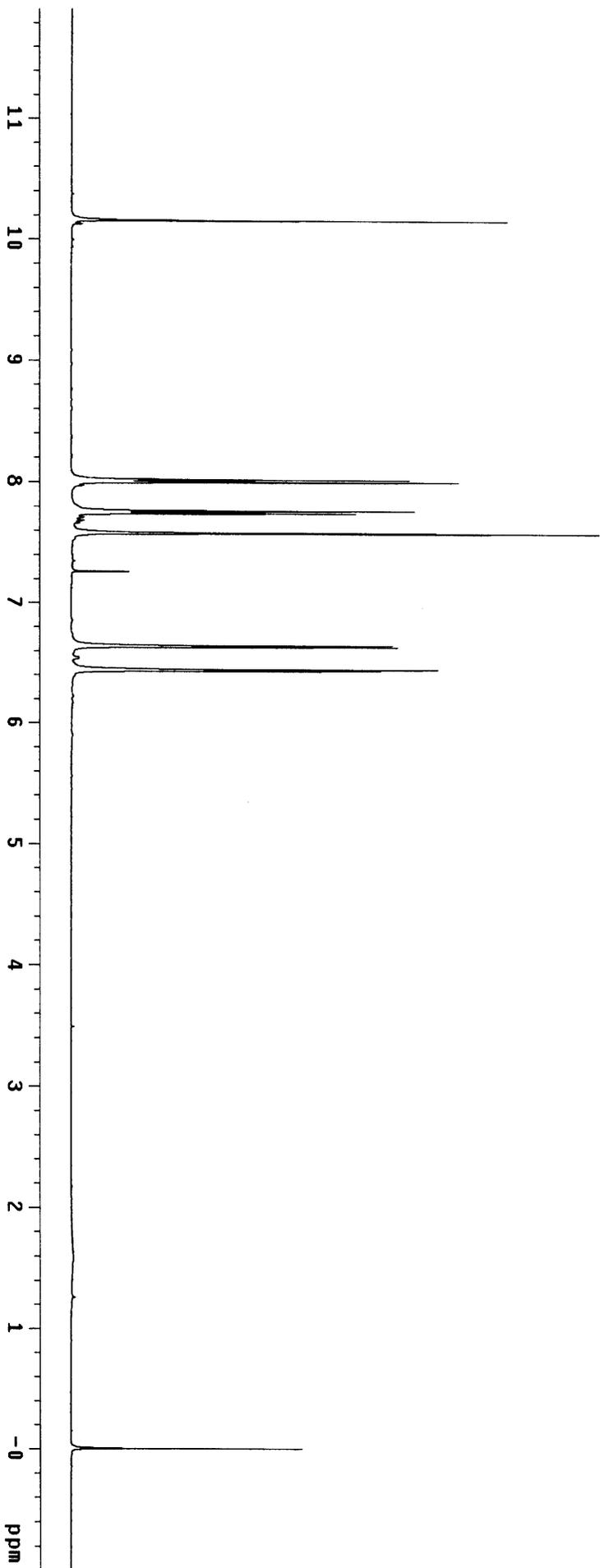
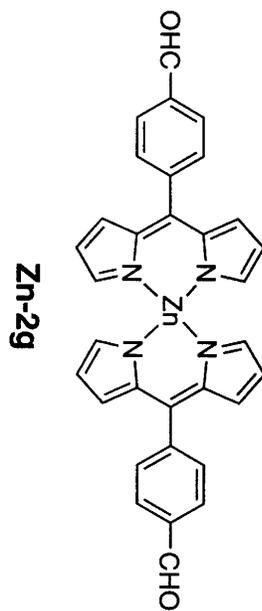
Zn-2c

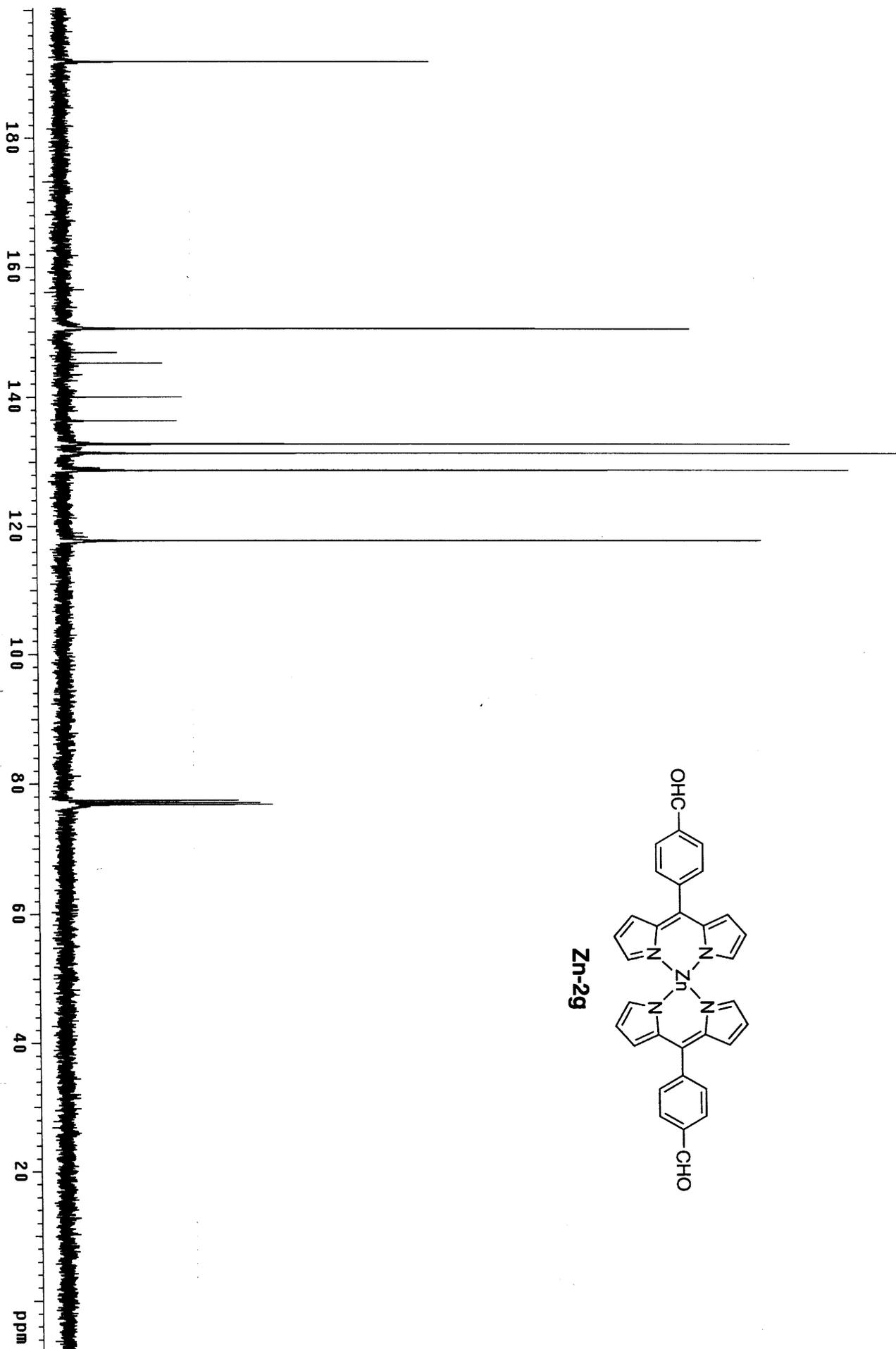
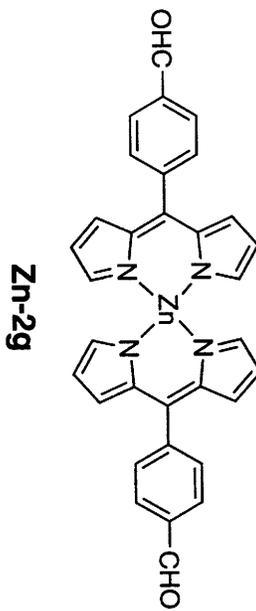


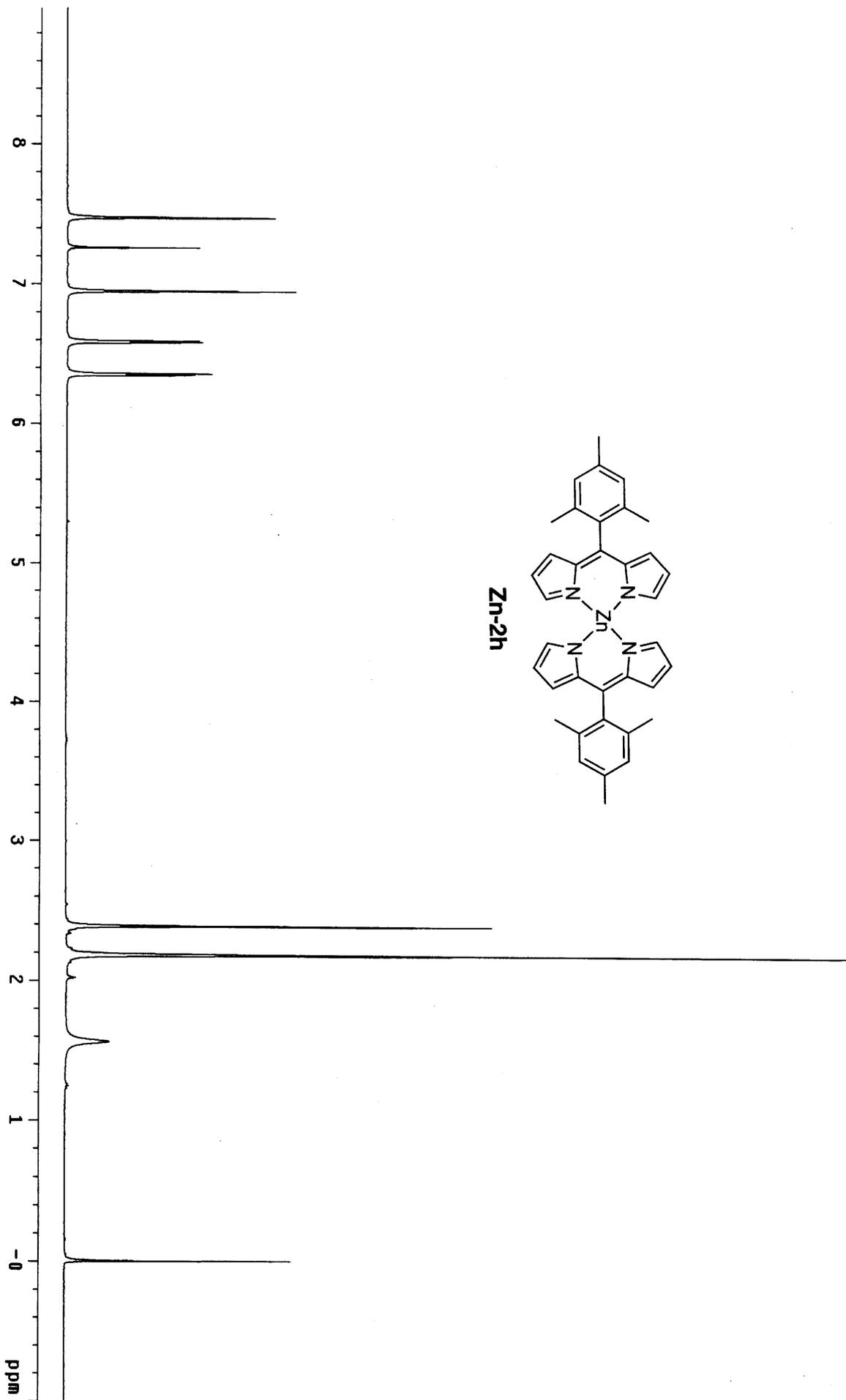


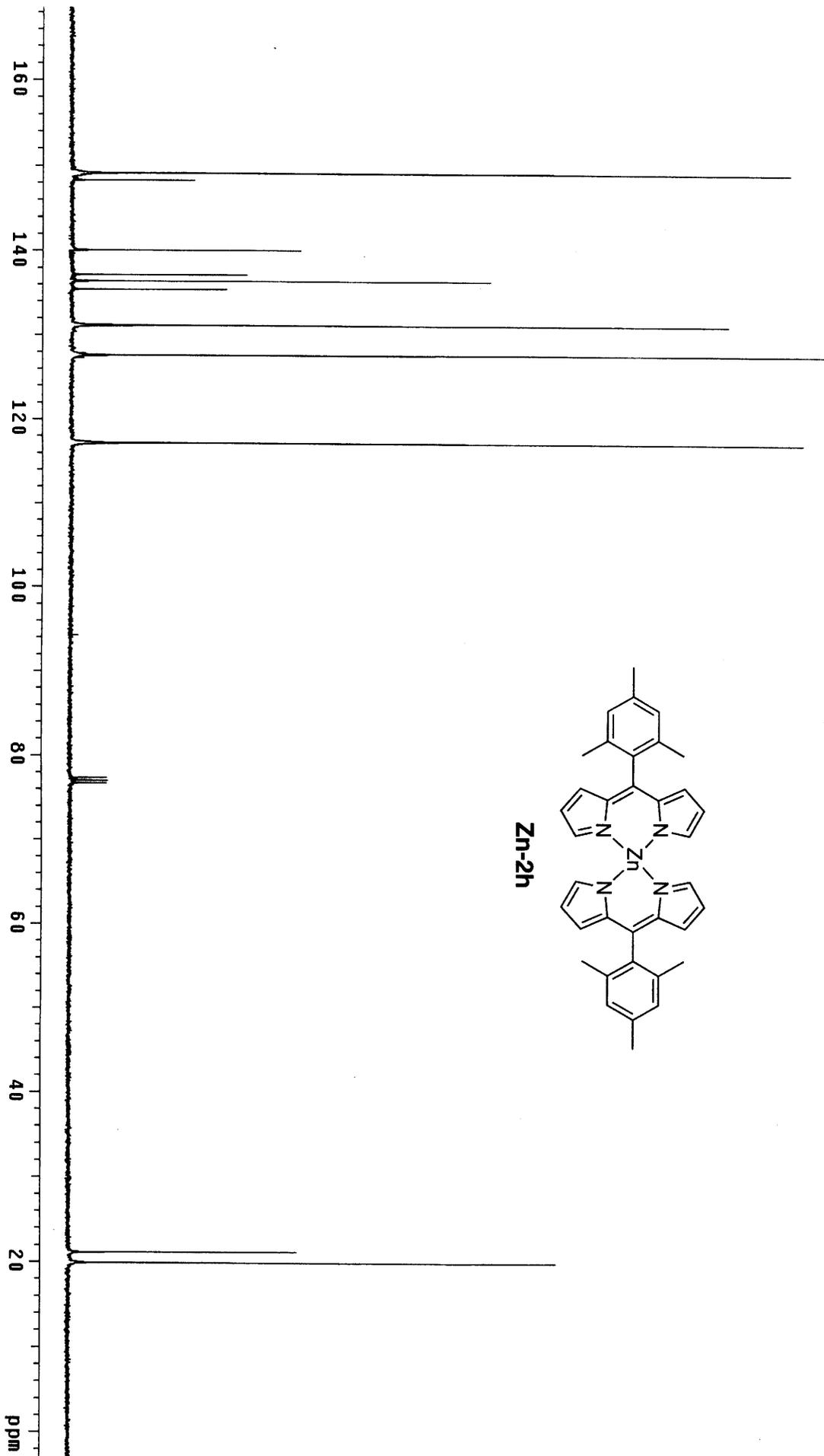


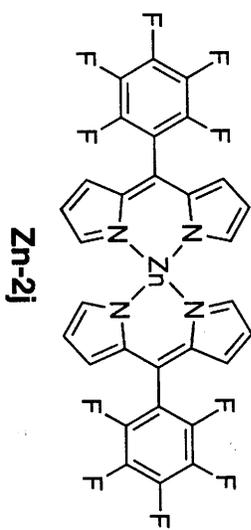
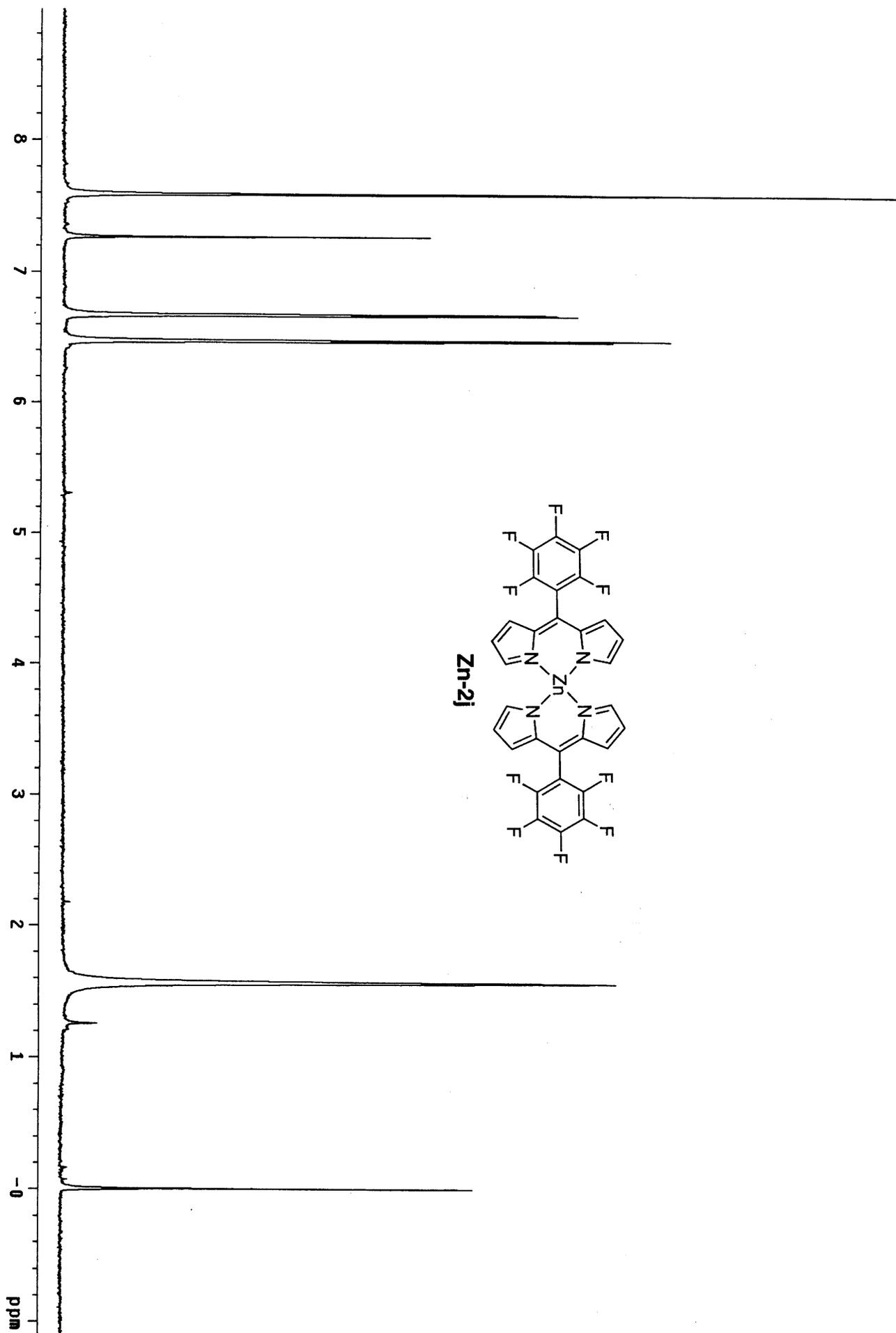


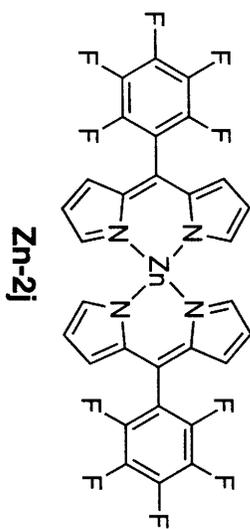
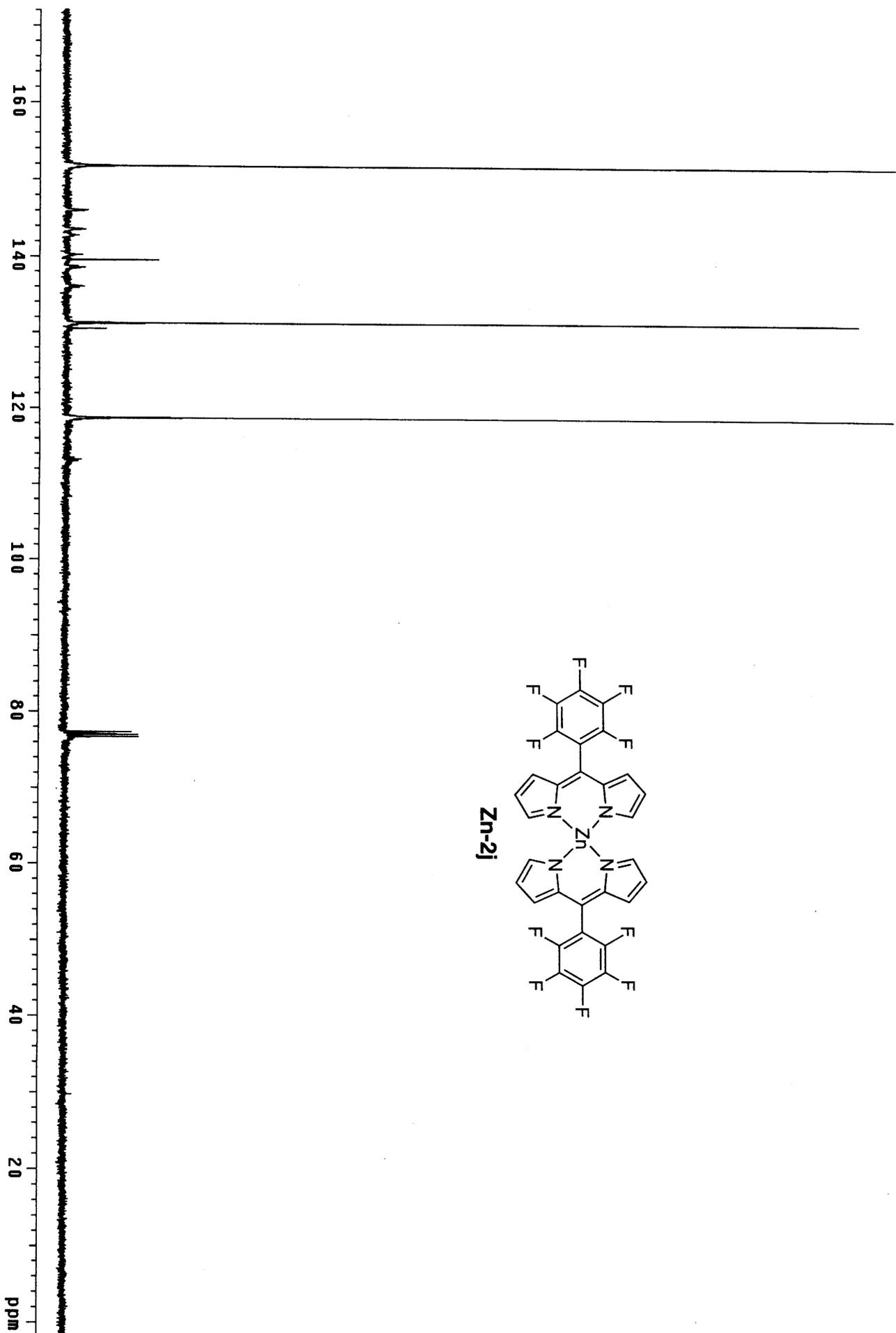


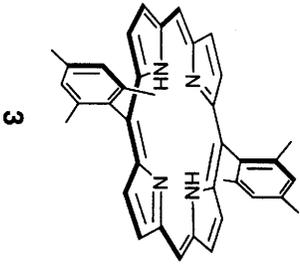
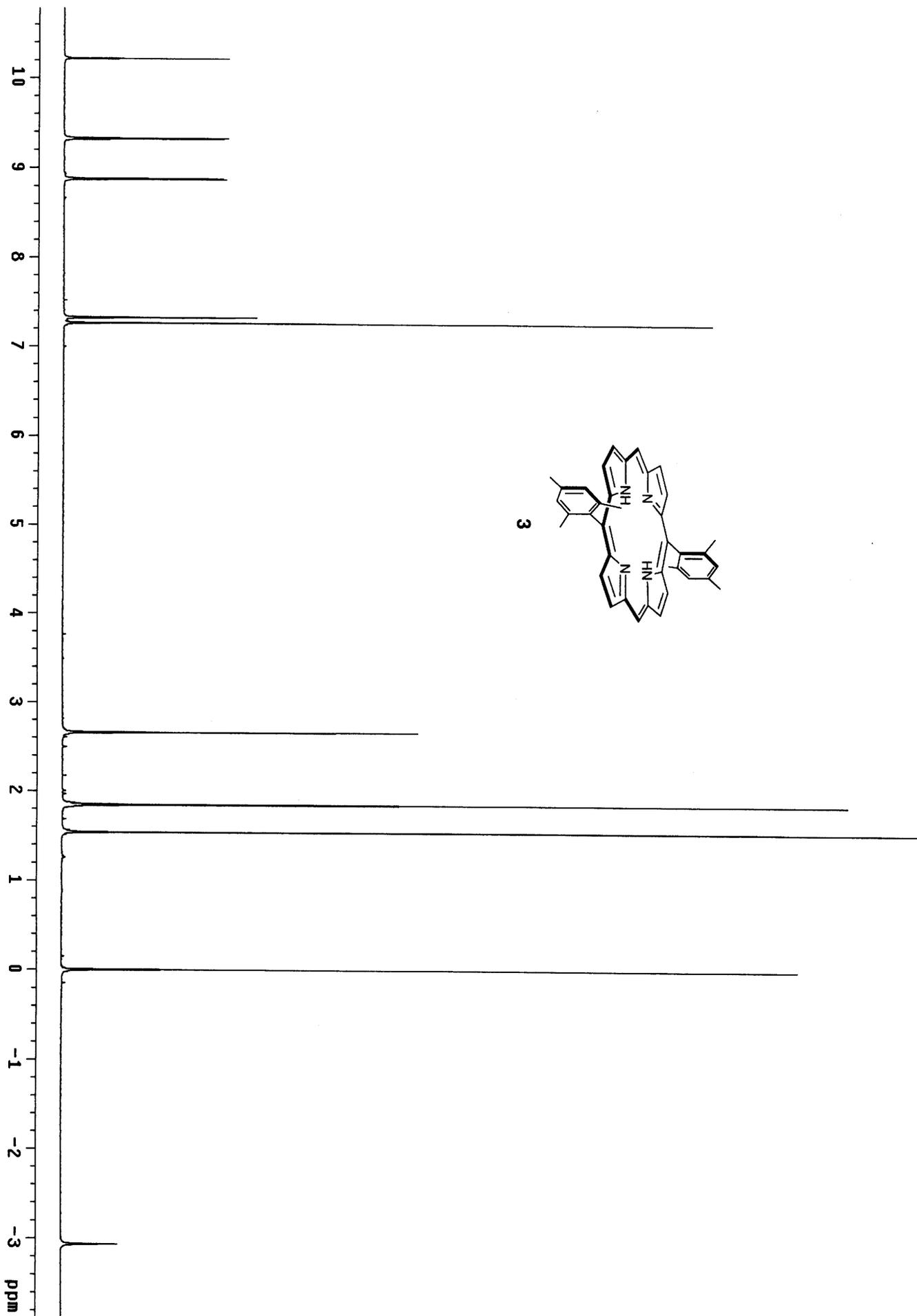


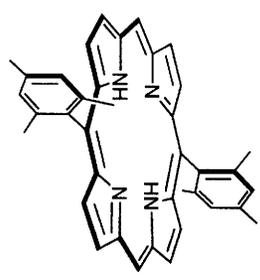
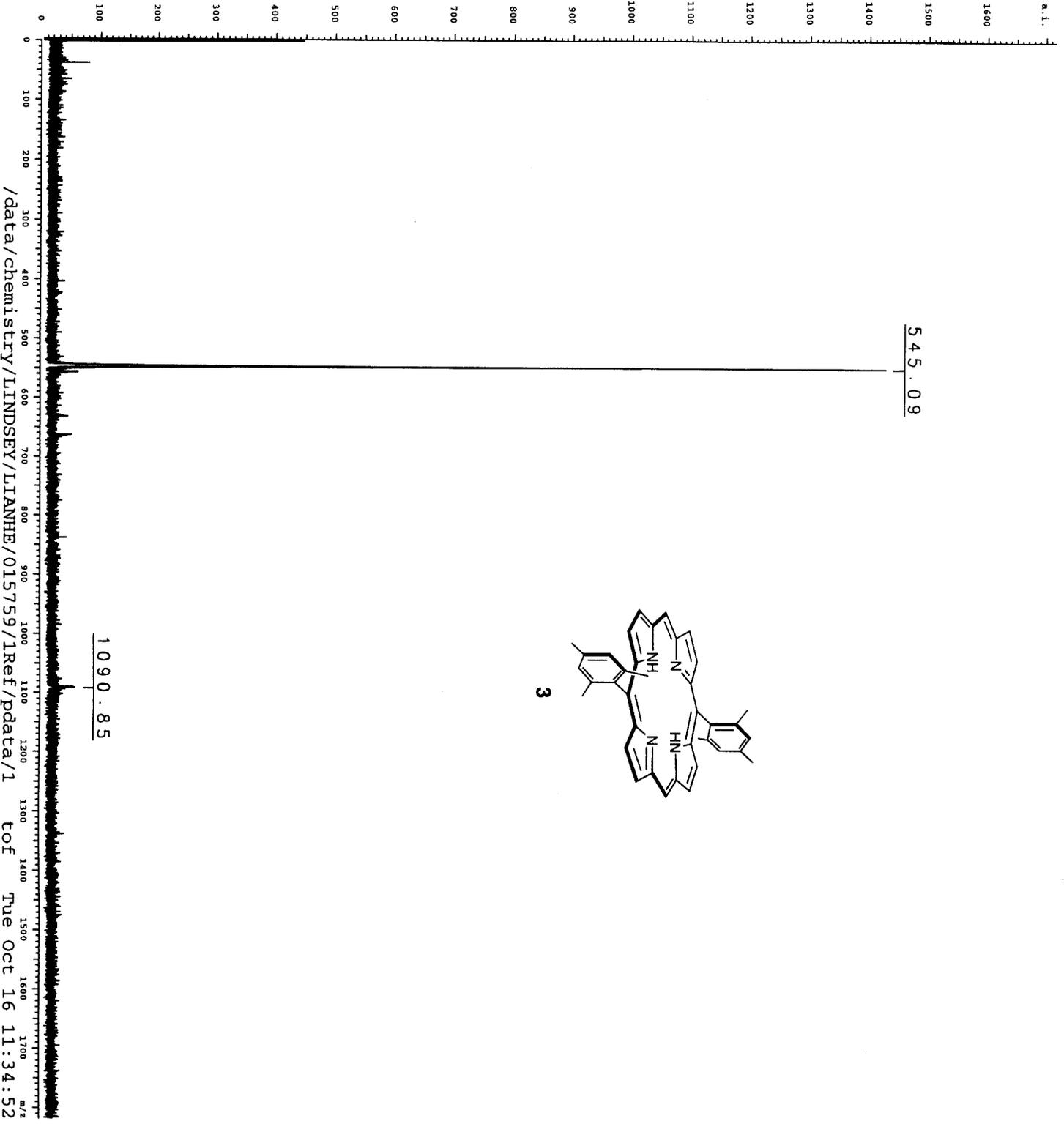






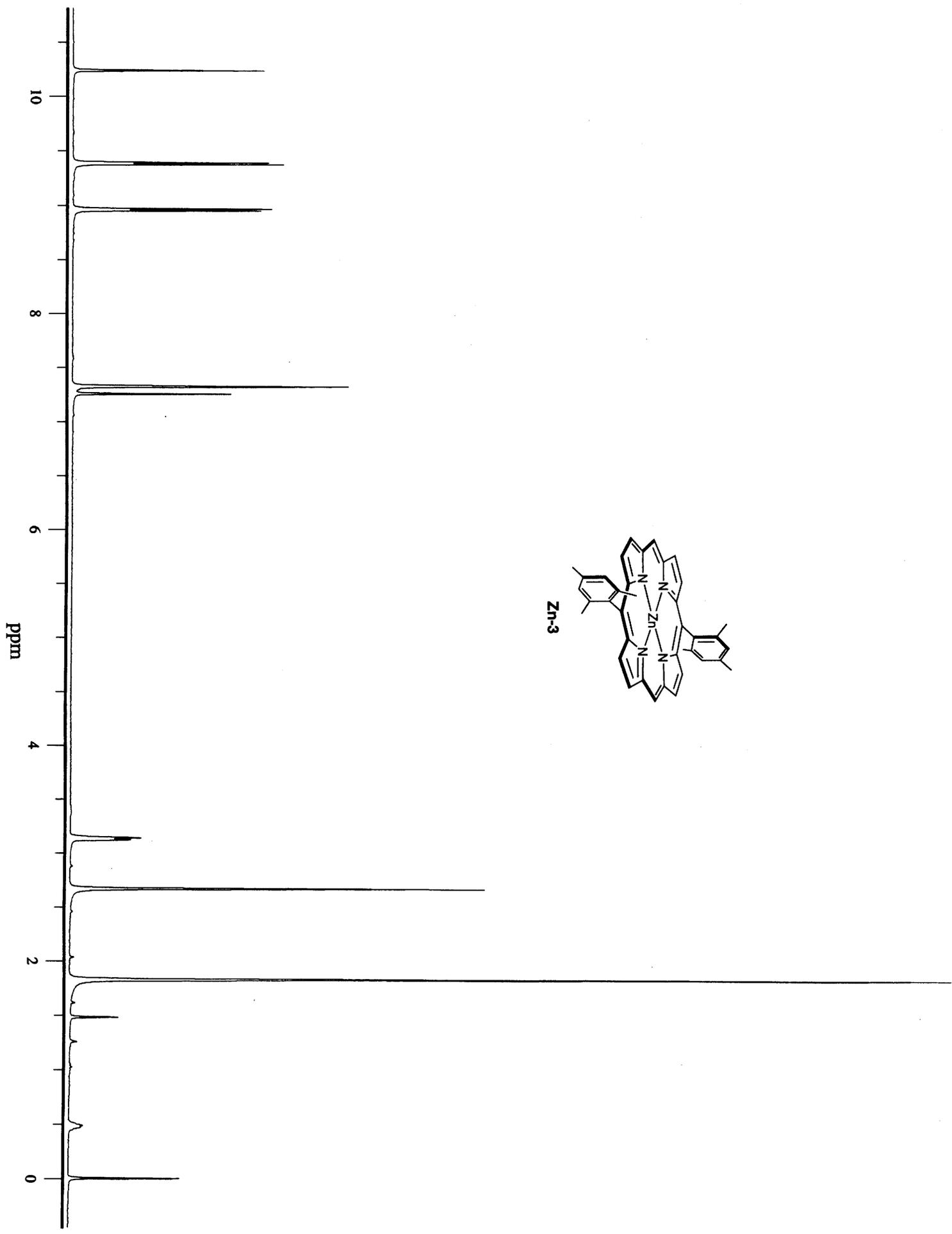
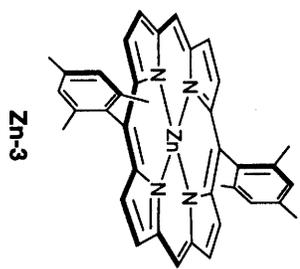


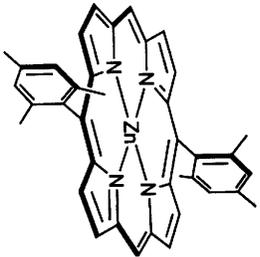
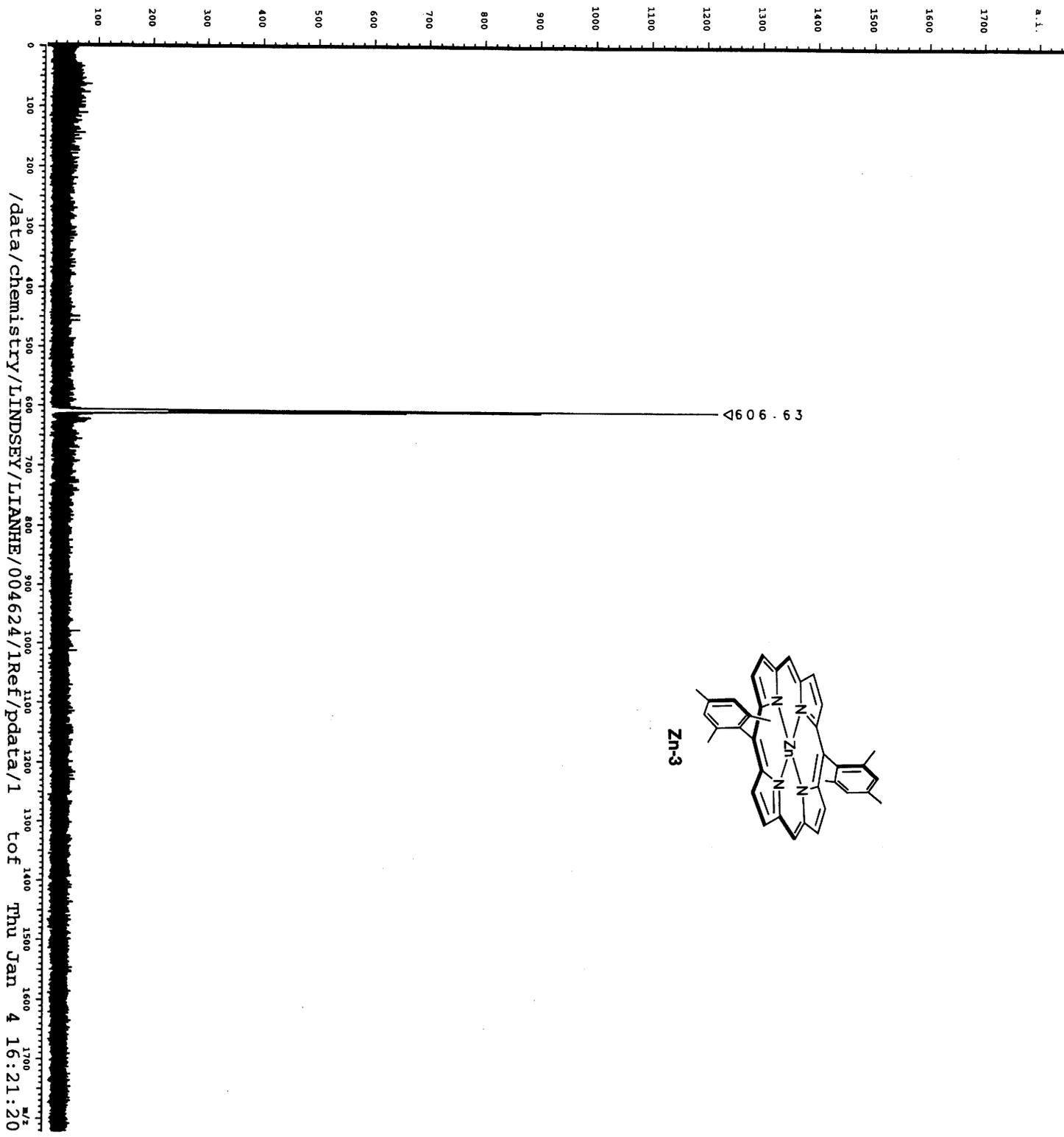




INSTRUM POP
 OPID N. Srinivasan
 SMPNAM 015759
 AQ_DATE Tue Oct 16 11:31:40 2001
 PATH /data/chemistry/LINDSEY/LIANHE
 POLARI ROS
 POFUM Retlector
 TPC 35071
 NSHORTS 0
 SMOPT51 0
 SMOPT52 0
 SMOPT53 0
 DW 1.00 [ns]
 Delay 0 [ns]
 Uls1 20.91 [KV]
 Uls2 18.70 [KV]
 Urf1 7.50 [KV]
 Urtans 10.00 [KV]
 RefFall 0.00 [KV]
 Refell 1.50 [KV]
 Urf2 2.00 [KV]
 REPRZ 1.00 [Hz]
 ATTEM 48.0
 ML1 2067125.193
 ML2 333.982
 0.000
 HITURBO no
 GIBBS no
 GIBBY Abort
 DEFLON no
 RLSEND no
 LANSND no
 ULSZND no
 DPCAL 530.84 [Da]
 PRMSZ 700.00 [Da]
 LAMBDA 0.22
 ISZBNDV 0.91
 CMT1 2Me-2H-P88 (Pb), purified
 CMT2 atcn = 48, shot = 70

S55

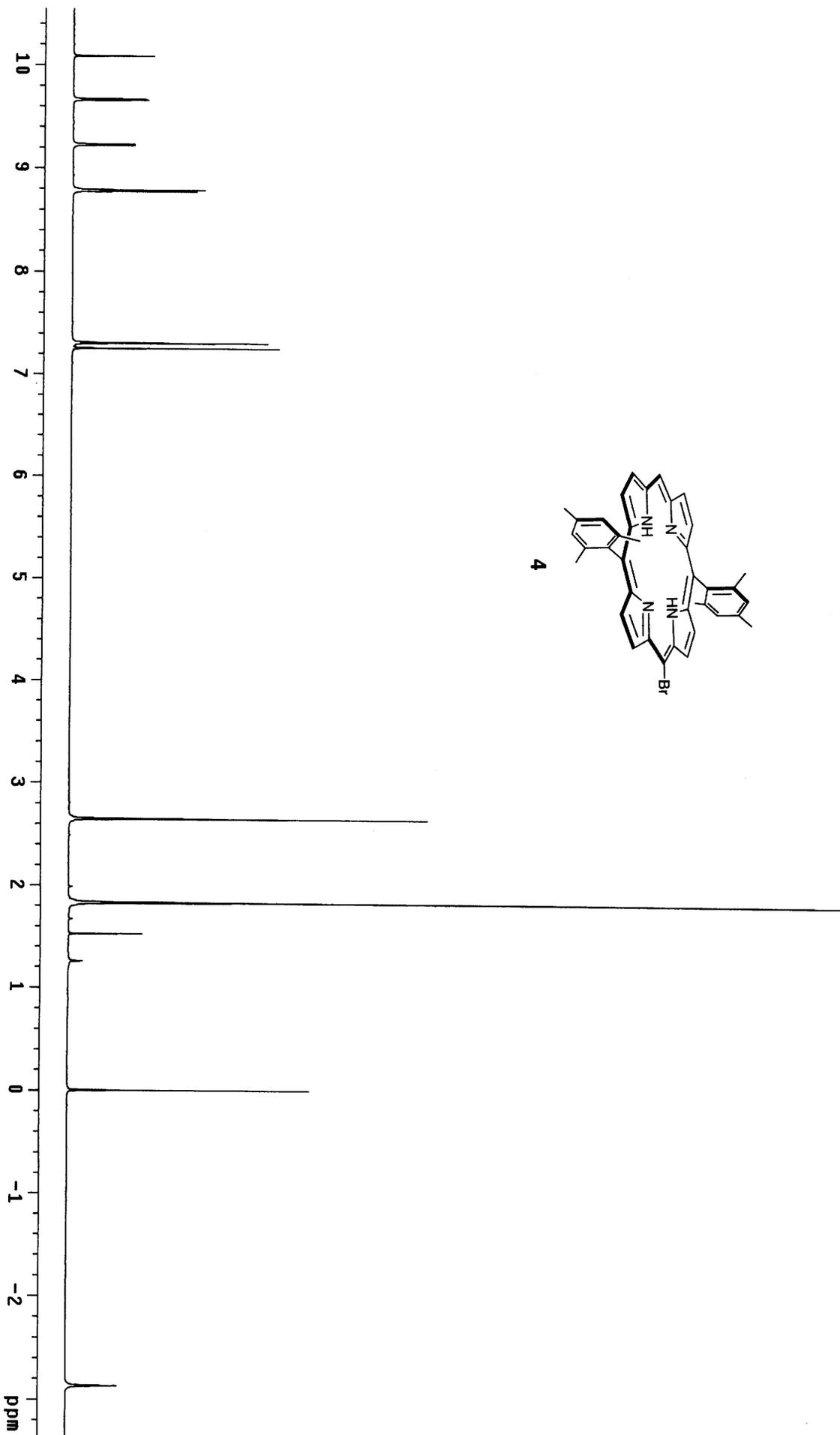
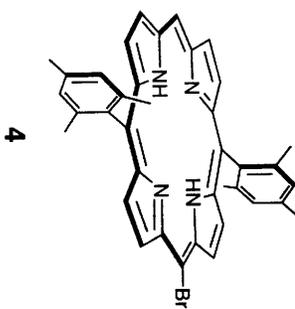


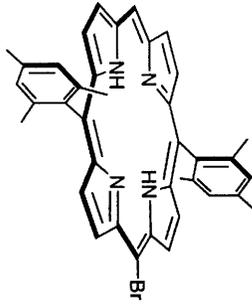
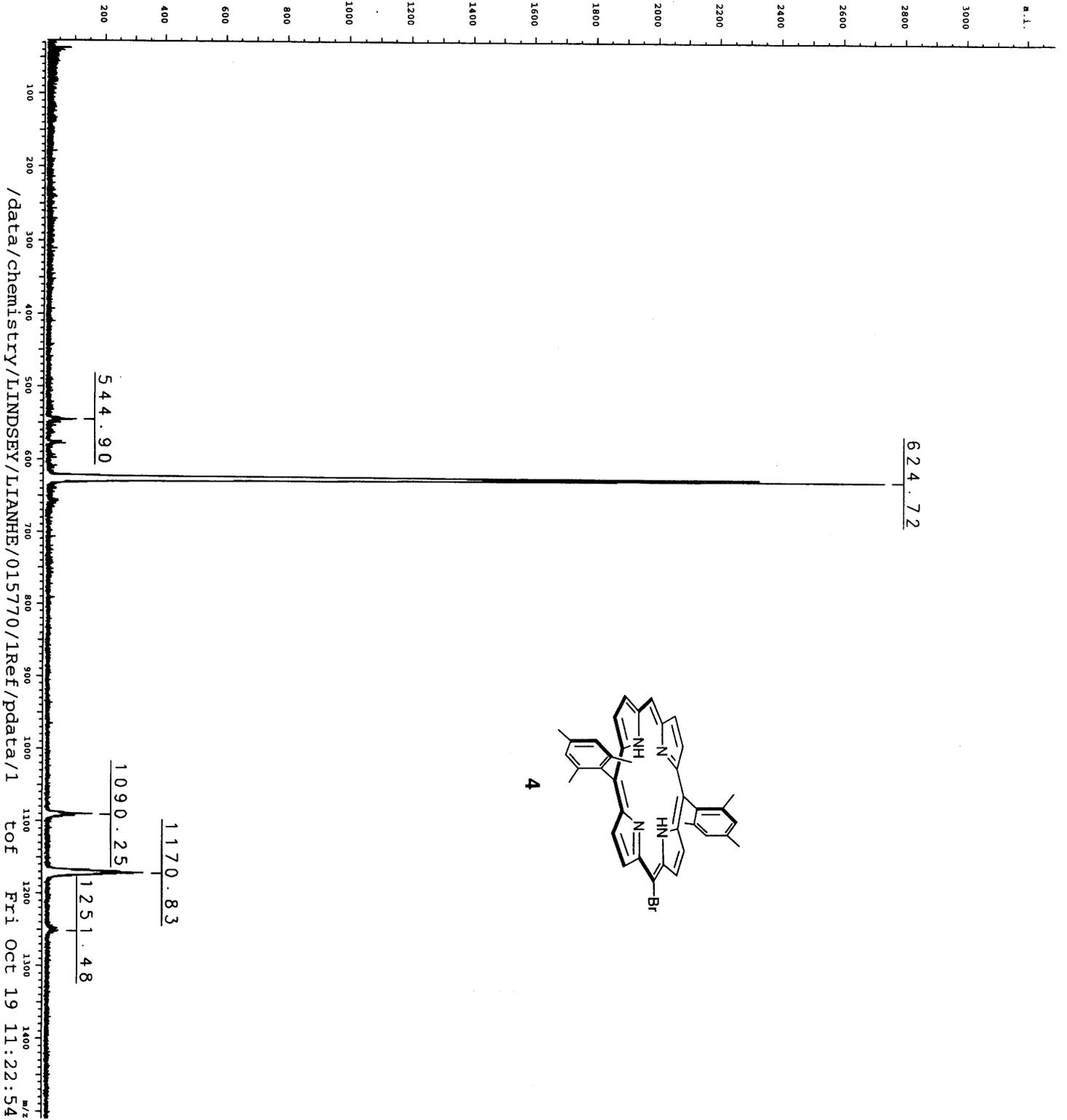


```

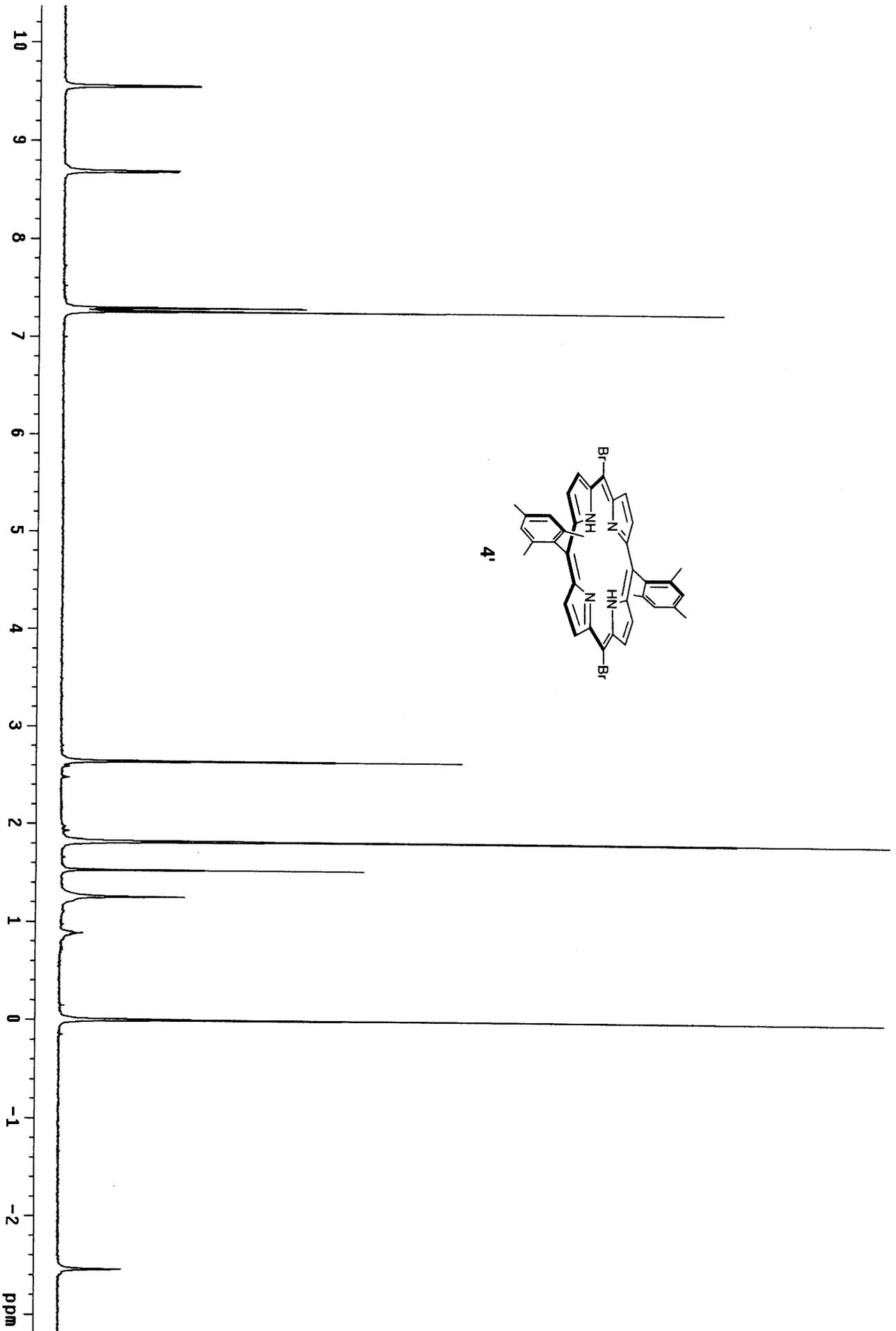
INSTRUM TOP
OpId N. Sriharyanan
SERVNM 004624
POLDATE Thu Jan 4 16:12:50 2001
PDIR /data/chemistry/LINDSEY/LIANHE
POLARI POS
AOOP_m Reflector
TD 30000
NOSHOTS 72
SKONTM 0
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
DM 0
DELAY 1.00 [ns]
Uls1 20.00 [kV]
Uls2 18.70 [kV]
Uls3 0.00 [kV]
Uls4 7.50 [kV]
Uls5 10.00 [kV]
Uls6 1.50 [kV]
Uls7 1.50 [kV]
Uls8 2.00 [kV]
Uls9 1.00 [kV]
REPHZ 28.0
ATTEN 2071592.159
ML1 353.982
ML2 0.000
HITURBO no
GDECON Yes
GDEPLY short
DEFLON no
FLUSSND no
LUSLND no
LUSLND no
LUSLND no
DPOL1
DPMAS 510.84 [Da]
RENDVAL 0.33
LARBVAL 0.28
ISZBNDV 0.91
CMT1 ZnS-2H-Zn-PHB
CMT2 atcn = 28, shot = 72
  
```

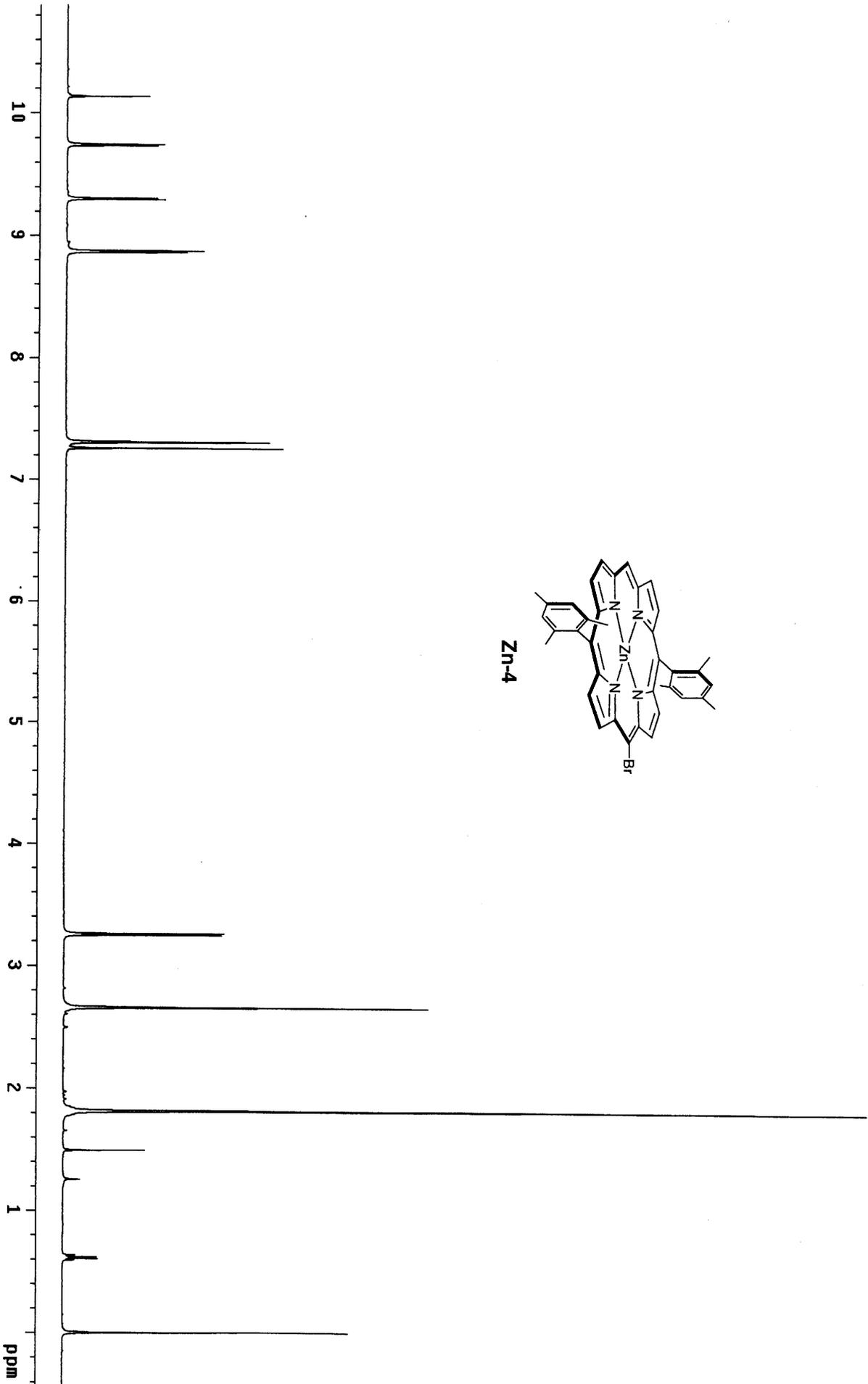
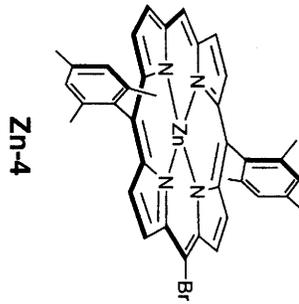
/data/chemistry/LINDSEY/LIANHE/004624/1Ref/pdata/1 tof Thu Jan 4 16:21:20 2001

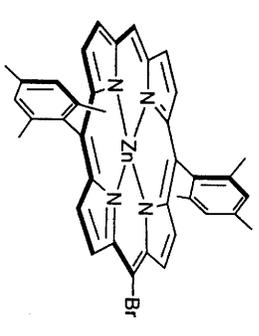
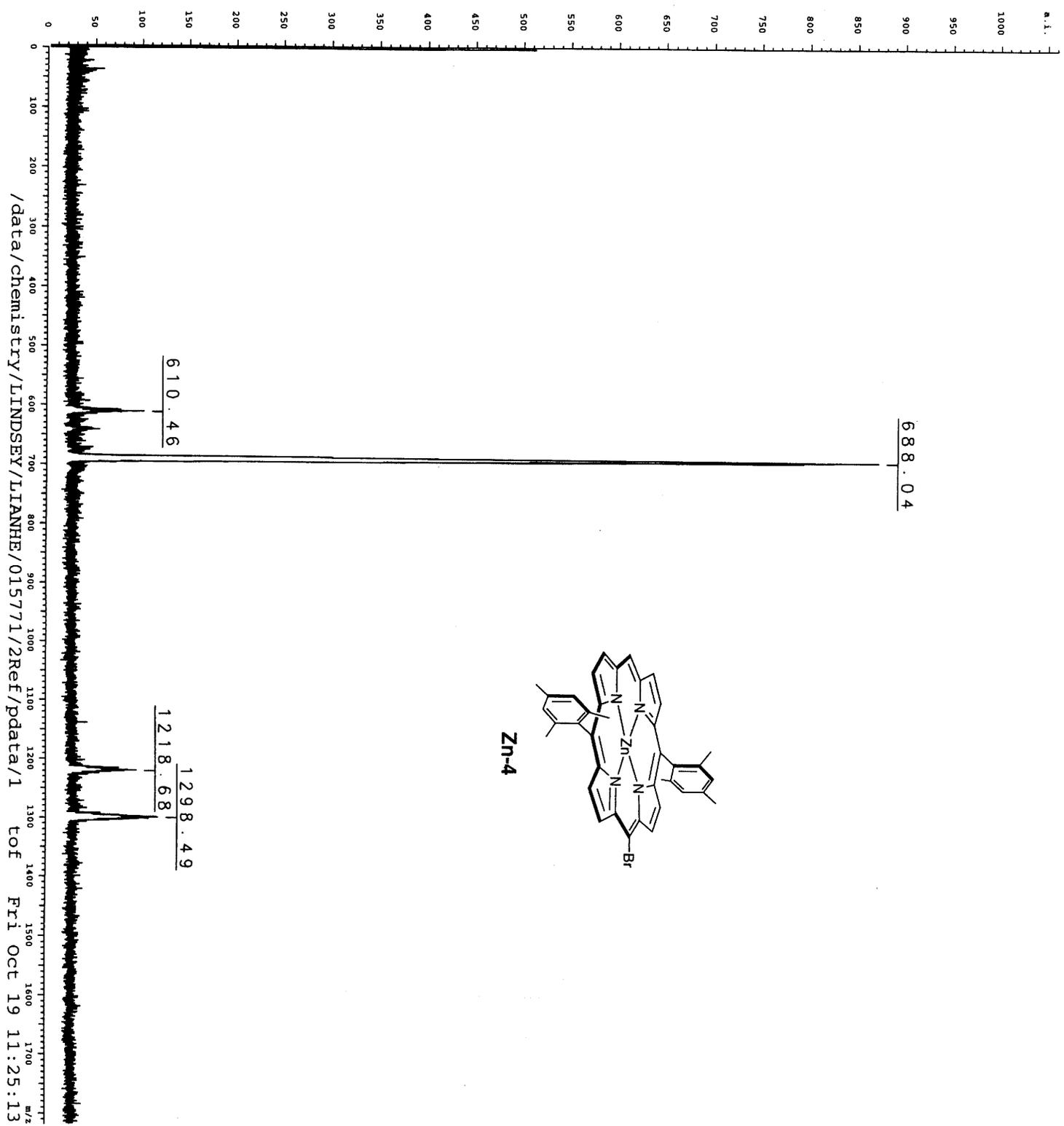




INSTRUM TOP
 OPID N. Srinivasan
 SRRNAM 015770
 AQ DATE Fri Oct 19 11:16:53 2001
 PATH /data/chemistry/LINDSEY/LIANHE
 POLARI POS
 MOD_Cm Reflector
 MAGNET 300.63
 MASHOOTS 0
 SMOPTIS1 0
 SMOPTIS2 0
 SMOPTIS3 0
 DM 1.00 (ns)
 DELAY 0 (ms)
 UHS 20.70 (KV)
 UHS2 18.70 (KV)
 Uref1 7.50 (KV)
 UHSans 10.00 (KV)
 UHSmas 0.00 (KV)
 UHSref 1.50 (KV)
 UHSel 2.00 (KV)
 UHSel 1.00 (Hz)
 REPRZ 35.0
 ATTEM 2067125.193
 ML1 333.982
 ML2 0.000
 ML3
 HITPRO no
 CTRN no
 CDRFLY short
 DERLON no
 RLNSAND no
 RLNSAND no
 UHSZAND no
 DRXAL 510.84 [Da]
 DRXSL 700.90 [Da]
 PENNYAL 0.28
 LABDVAL 0.91
 ISZBNDV 2MS-1Br-1H-FD-PBB
 CMT1 actn = 35, shot = 60
 CMT2

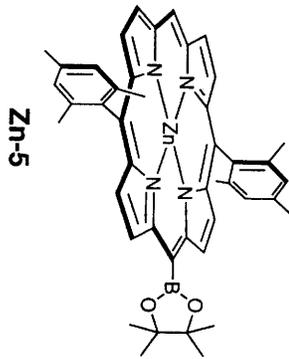
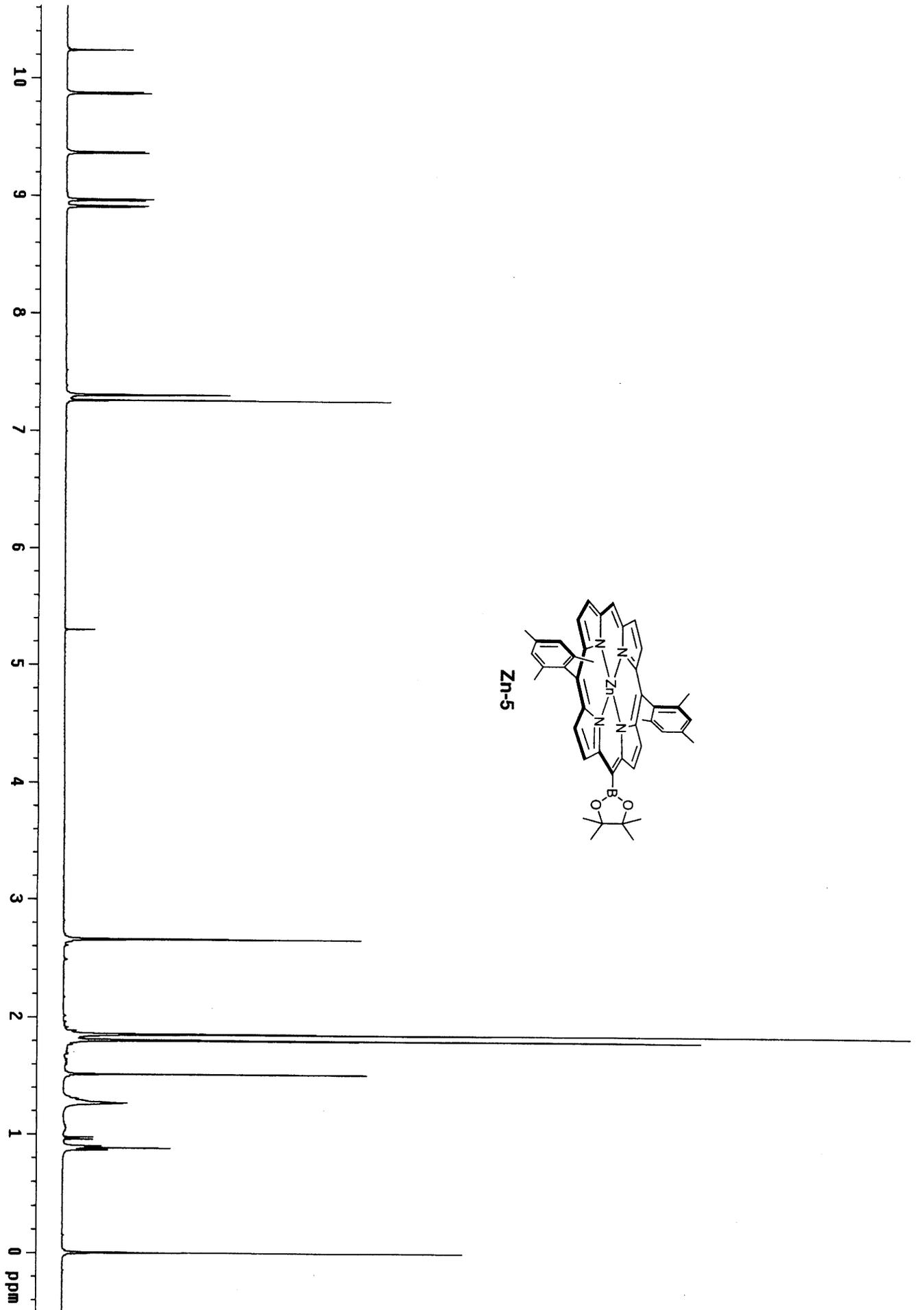


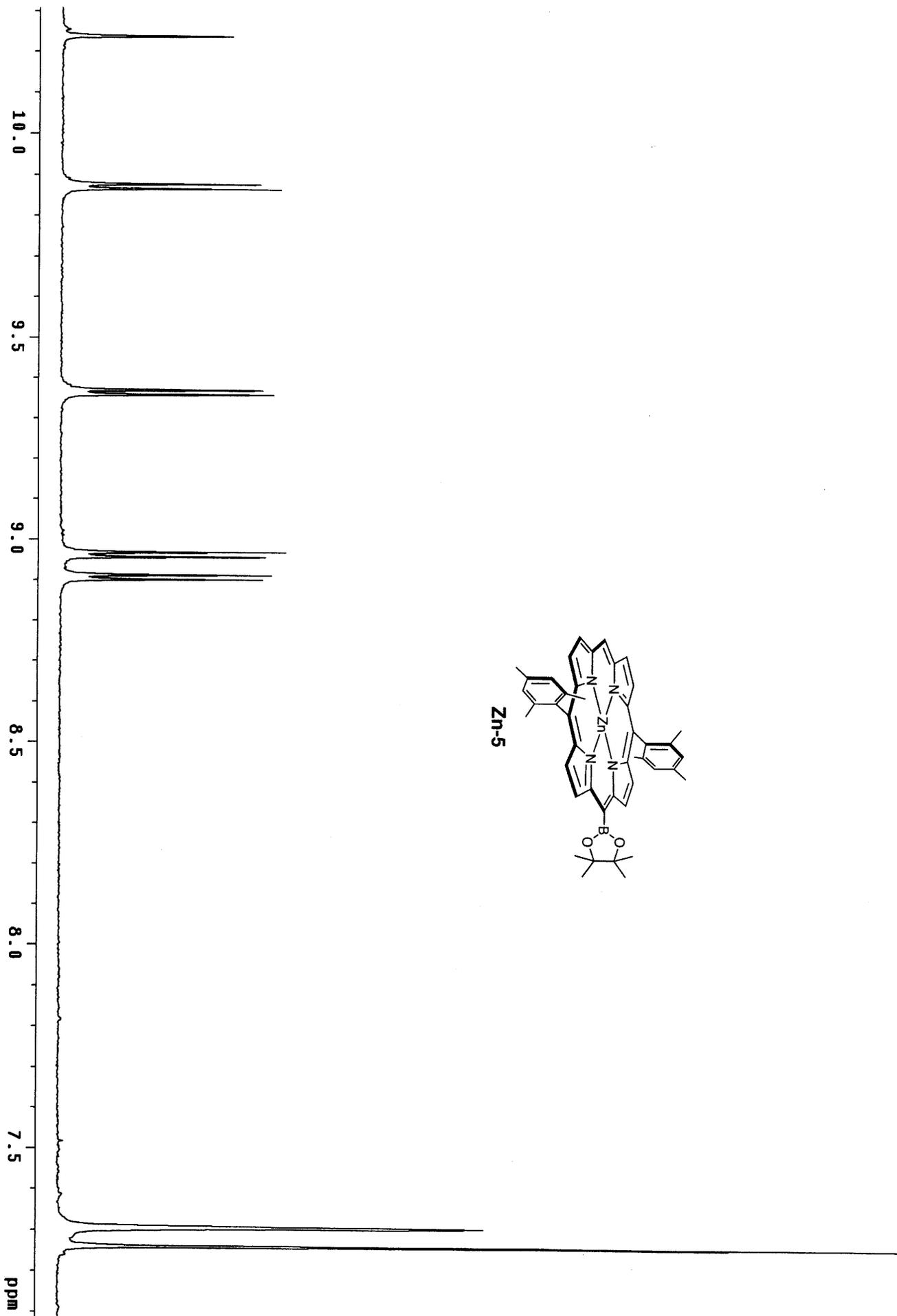


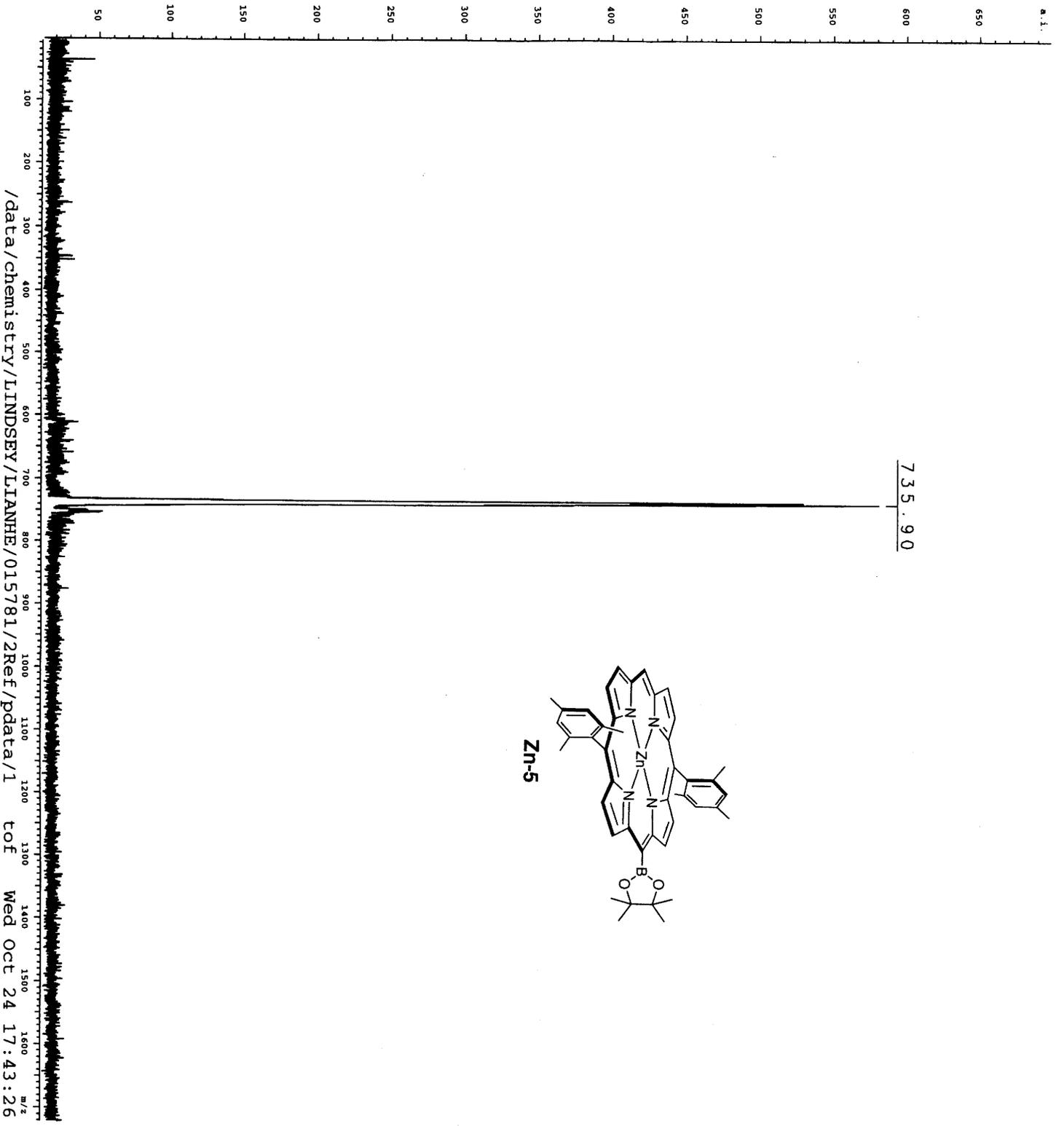


```

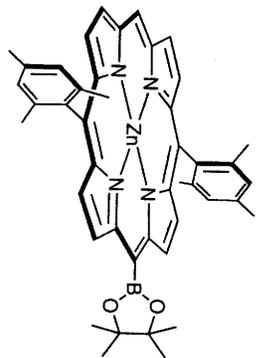
INSTRUM TOP
OPID N. Srinivasan
SRNAM 015771
AQ DATE Fri Oct 19 11:21:02 2001
PATH /data/chemistry/LINDSEY/LIANHE
POLARI POS
APC_Pm Retlector
NO SHOTS 300
SMOPTS1 1
SMOPTS2 2
SMOPTS3 0
DM 1.00 [ms]
U1a1 20.00 [KV]
U1a2 18.70 [KV]
U1e1 7.50 [KV]
U1i1a1 10.00 [KV]
U1e1 0.00 [KV]
U1e1 1.50 [KV]
U1e1 2.00 [KV]
REPHZ 1.00 [Hz]
ATTEN 43.0
M1 2067125.193
M12 335.982
M13 0.000
M14
M15
M16
M17
M18
M19
M20
M21
M22
M23
M24
M25
M26
M27
M28
M29
M30
M31
M32
M33
M34
M35
M36
M37
M38
M39
M40
M41
M42
M43
M44
M45
M46
M47
M48
M49
M50
M51
M52
M53
M54
M55
M56
M57
M58
M59
M60
M61
M62
M63
M64
M65
M66
M67
M68
M69
M70
M71
M72
M73
M74
M75
M76
M77
M78
M79
M80
M81
M82
M83
M84
M85
M86
M87
M88
M89
M90
M91
M92
M93
M94
M95
M96
M97
M98
M99
M100
M101
M102
M103
M104
M105
M106
M107
M108
M109
M110
M111
M112
M113
M114
M115
M116
M117
M118
M119
M120
M121
M122
M123
M124
M125
M126
M127
M128
M129
M130
M131
M132
M133
M134
M135
M136
M137
M138
M139
M140
M141
M142
M143
M144
M145
M146
M147
M148
M149
M150
M151
M152
M153
M154
M155
M156
M157
M158
M159
M160
M161
M162
M163
M164
M165
M166
M167
M168
M169
M170
M171
M172
M173
M174
M175
M176
M177
M178
M179
M180
M181
M182
M183
M184
M185
M186
M187
M188
M189
M190
M191
M192
M193
M194
M195
M196
M197
M198
M199
M200
M201
M202
M203
M204
M205
M206
M207
M208
M209
M210
M211
M212
M213
M214
M215
M216
M217
M218
M219
M220
M221
M222
M223
M224
M225
M226
M227
M228
M229
M230
M231
M232
M233
M234
M235
M236
M237
M238
M239
M240
M241
M242
M243
M244
M245
M246
M247
M248
M249
M250
M251
M252
M253
M254
M255
M256
M257
M258
M259
M260
M261
M262
M263
M264
M265
M266
M267
M268
M269
M270
M271
M272
M273
M274
M275
M276
M277
M278
M279
M280
M281
M282
M283
M284
M285
M286
M287
M288
M289
M290
M291
M292
M293
M294
M295
M296
M297
M298
M299
M300
M301
M302
M303
M304
M305
M306
M307
M308
M309
M310
M311
M312
M313
M314
M315
M316
M317
M318
M319
M320
M321
M322
M323
M324
M325
M326
M327
M328
M329
M330
M331
M332
M333
M334
M335
M336
M337
M338
M339
M340
M341
M342
M343
M344
M345
M346
M347
M348
M349
M350
M351
M352
M353
M354
M355
M356
M357
M358
M359
M360
M361
M362
M363
M364
M365
M366
M367
M368
M369
M370
M371
M372
M373
M374
M375
M376
M377
M378
M379
M380
M381
M382
M383
M384
M385
M386
M387
M388
M389
M390
M391
M392
M393
M394
M395
M396
M397
M398
M399
M400
M401
M402
M403
M404
M405
M406
M407
M408
M409
M410
M411
M412
M413
M414
M415
M416
M417
M418
M419
M420
M421
M422
M423
M424
M425
M426
M427
M428
M429
M430
M431
M432
M433
M434
M435
M436
M437
M438
M439
M440
M441
M442
M443
M444
M445
M446
M447
M448
M449
M450
M451
M452
M453
M454
M455
M456
M457
M458
M459
M460
M461
M462
M463
M464
M465
M466
M467
M468
M469
M470
M471
M472
M473
M474
M475
M476
M477
M478
M479
M480
M481
M482
M483
M484
M485
M486
M487
M488
M489
M490
M491
M492
M493
M494
M495
M496
M497
M498
M499
M500
M501
M502
M503
M504
M505
M506
M507
M508
M509
M510
M511
M512
M513
M514
M515
M516
M517
M518
M519
M520
M521
M522
M523
M524
M525
M526
M527
M528
M529
M530
M531
M532
M533
M534
M535
M536
M537
M538
M539
M540
M541
M542
M543
M544
M545
M546
M547
M548
M549
M550
M551
M552
M553
M554
M555
M556
M557
M558
M559
M560
M561
M562
M563
M564
M565
M566
M567
M568
M569
M570
M571
M572
M573
M574
M575
M576
M577
M578
M579
M580
M581
M582
M583
M584
M585
M586
M587
M588
M589
M590
M591
M592
M593
M594
M595
M596
M597
M598
M599
M600
M601
M602
M603
M604
M605
M606
M607
M608
M609
M610
M611
M612
M613
M614
M615
M616
M617
M618
M619
M620
M621
M622
M623
M624
M625
M626
M627
M628
M629
M630
M631
M632
M633
M634
M635
M636
M637
M638
M639
M640
M641
M642
M643
M644
M645
M646
M647
M648
M649
M650
M651
M652
M653
M654
M655
M656
M657
M658
M659
M660
M661
M662
M663
M664
M665
M666
M667
M668
M669
M670
M671
M672
M673
M674
M675
M676
M677
M678
M679
M680
M681
M682
M683
M684
M685
M686
M687
M688
M689
M690
M691
M692
M693
M694
M695
M696
M697
M698
M699
M700
M701
M702
M703
M704
M705
M706
M707
M708
M709
M710
M711
M712
M713
M714
M715
M716
M717
M718
M719
M720
M721
M722
M723
M724
M725
M726
M727
M728
M729
M730
M731
M732
M733
M734
M735
M736
M737
M738
M739
M740
M741
M742
M743
M744
M745
M746
M747
M748
M749
M750
M751
M752
M753
M754
M755
M756
M757
M758
M759
M760
M761
M762
M763
M764
M765
M766
M767
M768
M769
M770
M771
M772
M773
M774
M775
M776
M777
M778
M779
M780
M781
M782
M783
M784
M785
M786
M787
M788
M789
M790
M791
M792
M793
M794
M795
M796
M797
M798
M799
M800
M801
M802
M803
M804
M805
M806
M807
M808
M809
M810
M811
M812
M813
M814
M815
M816
M817
M818
M819
M820
M821
M822
M823
M824
M825
M826
M827
M828
M829
M830
M831
M832
M833
M834
M835
M836
M837
M838
M839
M840
M841
M842
M843
M844
M845
M846
M847
M848
M849
M850
M851
M852
M853
M854
M855
M856
M857
M858
M859
M860
M861
M862
M863
M864
M865
M866
M867
M868
M869
M870
M871
M872
M873
M874
M875
M876
M877
M878
M879
M880
M881
M882
M883
M884
M885
M886
M887
M888
M889
M890
M891
M892
M893
M894
M895
M896
M897
M898
M899
M900
M901
M902
M903
M904
M905
M906
M907
M908
M909
M910
M911
M912
M913
M914
M915
M916
M917
M918
M919
M920
M921
M922
M923
M924
M925
M926
M927
M928
M929
M930
M931
M932
M933
M934
M935
M936
M937
M938
M939
M940
M941
M942
M943
M944
M945
M946
M947
M948
M949
M950
M951
M952
M953
M954
M955
M956
M957
M958
M959
M960
M961
M962
M963
M964
M965
M966
M967
M968
M969
M970
M971
M972
M973
M974
M975
M976
M977
M978
M979
M980
M981
M982
M983
M984
M985
M986
M987
M988
M989
M990
M991
M992
M993
M994
M995
M996
M997
M998
M999
M1000
M1001
M1002
M1003
M1004
M1005
M1006
M1007
M1008
M1009
M1010
M1011
M1012
M1013
M1014
M1015
M1016
M1017
M1018
M1019
M1020
M1021
M1022
M1023
M1024
M1025
M1026
M1027
M1028
M1029
M1030
M1031
M1032
M1033
M1034
M1035
M1036
M1037
M1038
M1039
M1040
M1041
M1042
M1043
M1044
M1045
M1046
M1047
M1048
M1049
M1050
M1051
M1052
M1053
M1054
M1055
M1056
M1057
M1058
M1059
M1060
M1061
M1062
M1063
M1064
M1065
M1066
M1067
M1068
M1069
M1070
M1071
M1072
M1073
M1074
M1075
M1076
M1077
M1078
M1079
M1080
M1081
M1082
M1083
M1084
M1085
M1086
M1087
M1088
M1089
M1090
M1091
M1092
M1093
M1094
M1095
M1096
M1097
M1098
M1099
M1100
M1101
M1102
M1103
M1104
M1105
M1106
M1107
M1108
M1109
M1110
M1111
M1112
M1113
M1114
M1115
M1116
M1117
M1118
M1119
M1120
M1121
M1122
M1123
M1124
M1125
M1126
M1127
M1128
M1129
M1130
M1131
M1132
M1133
M1134
M1135
M1136
M1137
M1138
M1139
M1140
M1141
M1142
M1143
M1144
M1145
M1146
M1147
M1148
M1149
M1150
M1151
M1152
M1153
M1154
M1155
M1156
M1157
M1158
M1159
M1160
M1161
M1162
M1163
M1164
M1165
M1166
M1167
M1168
M1169
M1170
M1171
M1172
M1173
M1174
M1175
M1176
M1177
M1178
M1179
M1180
M1181
M1182
M1183
M1184
M1185
M1186
M1187
M1188
M1189
M1190
M1191
M1192
M1193
M1194
M1195
M1196
M1197
M1198
M1199
M1200
M1201
M1202
M1203
M1204
M1205
M1206
M1207
M1208
M1209
M1210
M1211
M1212
M1213
M1214
M1215
M1216
M1217
M1218
M1219
M1220
M1221
M1222
M1223
M1224
M1225
M1226
M1227
M1228
M1229
M1230
M1231
M1232
M1233
M1234
M1235
M1236
M1237
M1238
M1239
M1240
M1241
M1242
M1243
M1244
M1245
M1246
M1247
M1248
M1249
M1250
M1251
M1252
M1253
M1254
M1255
M1256
M1257
M1258
M1259
M1260
M1261
M1262
M1263
M1264
M1265
M1266
M1267
M1268
M1269
M1270
M1271
M1272
M1273
M1274
M1275
M1276
M1277
M1278
M1279
M1280
M1281
M1282
M1283
M1284
M1285
M1286
M1287
M1288
M1289
M1290
M1291
M1292
M1293
M1294
M1295
M1296
M1297
M1298
M1299
M1300
M1301
M1302
M1303
M1304
M1305
M1306
M1307
M1308
M1309
M1310
M1311
M1312
M1313
M1314
M1315
M1316
M1317
M1318
M1319
M1320
M1321
M1322
M1323
M1324
M1325
M1326
M1327
M1328
M1329
M1330
M1331
M1332
M1333
M1334
M1335
M1336
M1337
M1338
M1339
M1340
M1341
M1342
M1343
M1344
M1345
M1346
M1347
M1348
M1349
M1350
M1351
M1352
M1353
M1354
M1355
M1356
M1357
M1358
M1359
M1360
M1361
M1362
M1363
M1364
M1365
M1366
M1367
M1368
M1369
M1370
M1371
M1372
M1373
M1374
M1375
M1376
M1377
M1378
M1379
M1380
M1381
M1382
M1383
M1384
M1385
M1386
M1387
M1388
M1389
M1390
M1391
M1392
M1393
M1394
M1395
M1396
M1397
M1398
M1399
M1400
M1401
M1402
M1403
M1404
M1405
M1406
M1407
M1408
M1409
M1410
M1411
M1412
M1413
M1414
M1415
M1416
M1417
M1418
M1419
M1420
M1421
M1422
M1423
M1424
M1425
M1426
M1427
M1428
M1429
M1430
M1431
M1432
M1433
M1434
M1435
M1436
M1437
M1438
M1439
M1440
M1441
M1442
M1443
M1444
M1445
M1446
M1447
M1448
M1449
M1450
M1451
M1452
M1453
M1454
M1455
M1456
M1457
M1458
M1459
M1460
M1461
M1462
M1463
M1464
M1465
M1466
M1467
M1468
M1469
M1470
M1471
M1472
M1473
M1474
M1475
M1476
M1477
M1478
M1479
M1480
M1481
M1482
M1483
M1484
M1485
M1486
M1487
M1488
M1489
M1490
M1491
M1492
M1493
M1494
M1495
M1496
M1497
M1498
M1499
M1500
M1501
M1502
M1503
M1504
M1505
M1506
M1507
M1508
M1509
M1510
M1511
M1512
M1513
M1514
M1515
M1516
M1517
M1518
M1519
M1520
M1521
M1522
M1523
M1524
M1525
M1526
M1527
M1528
M1529
M1530
M1531
M1532
M1533
M1534
M1535
M1536
M1537
M1538
M1539
M1540
M1541
M1542
M1543
M1544
M1545
M1546
M1547
M1548
M1549
M1550
M1551
M1552
M1553
M1554
M1555
M1556
M1557
M1558
M1559
M1560
M1561
M1562
M1563
M1564
M1565
M1566
M1567
M1568
M1569
M1570
M1571
M1572
M1573
M1574
M1575
M1576
M1577
M1578
M1579
M1580
M1581
M1582
M1583
M1584
M1585
M1586
M1587
M1588
M1589
M1590
M1591
M1592
M1593
M1594
M1595
M1596
M1597
M1598
M1599
M1600
M1601
M1602
M1603
M1604
M1605
M1606
M1607
M1608
M1609
M1610
M1611
M1612
M1613
M1614
M1615
M1616
M1617
M1618
M1619
M1620
M1621
M1622
M1623
M1624
M1625
M1626
M1627
M1628
M1629
M1630
M1631
M1632
M1633
M1634
M1635
M1636
M1637
M1638
M1639
M1640
M1641
M1642
M1643
M1644
M1645
M1646
M1647
M1648
M1649
M1650
M1651
M1652
M1653
M1654
M1655
M1656
M1657
M1658
M1659
M1660
M1661
M1662
M1663
M1664
M1665
M1666
M1667
M1668
M1669
M1670
M1671
M1672
M1673
M1674
M1675
M1676
M1677
M1678
M1679
M1680
M1681
M1682
M1683
M1684
M1685
M1686
M1687
M1688
M1689
M1690
M1691
M1692
M1693
M1694
M1695
M1696
M1697
M1698
M1699
M1700
M1701
M1702
M1703
M1704
M1705
M1706
M1707
M1708
M1709
M1710
M1711
M1712
M1713
M1714
M1715
M1716
M1717
M1718
M1719
M1720
M1721
M1722
M1723
M1724
M1725
M1726
M1727
M1728
M1729
M1730
M1731
M1732
M1733
M1734
M1735
M1736
M1737
M1738
M1739
M1740
M1741
M1742
M1743
M1744
M1745
M1746
M1747
M1748
M1749
M1750
M1751
M1752
M1753
M1754
M1755
M1756
M1757
M1758
M1759
M1760
M1761
M1762
M1763
M1764
M1765
M1766
M1767
M1768
M1769
M1770
M1771
M1772
M1773
M1774
M1775
M1776
M1777
M1778
M1779
M1780
M1781
M1782
M1783
M1784
M1785
M1786
M1787
M1788
M1789
M1790
M1791
M1792
M1793
M1794
M1795
M1796
M1797
M1798
M1799
M1800
M1801
M1802
M1803
M1804
M1805
M1806
M1807
M1808
M1809
M1810
M1811
M1812
M1813
M1814
M1815
M1816
M1817
M1818
M1819
M1820
M1821
M1822
M1823
M1824
M1825
M1826
M1827
M1828
M1829
M1830
M1831
M1832
M1833
M1834
M1835
M1836
M1837
M1838
M1839
M1840
M1841
M1842
M1843
M1844
M1845
M1846
M1847
M1848
M1849
M1850
M1851
M1852
M1853
M1854
M1855
M1856
M1857
M1858
M1859
M1860
M1861
M1862
M1863
M1864
M1865
M1866
M1867
M1868
M1869
M1870
M1871
M1872
M1873
M1874
M1875
M1876
M1877
M1878
M1879
M1880
M1881
M1882
M1883
M1884
M1885
M1886
M1887
M1888
M1889
M1890
M1891
M1892
M1893
M1894
M1895
M1896
M1897
M1898
M1899
M1900
M1901
M1902
M1903
M1904
M1905
M1906
M1907
M1908
M1909
M1910
M1911
M1912
M1913
M1914
M1915
M1916
M1917
M1918
M1919
M1920
M1921
M1922
M1923
M1924
M1925
M1926
M1927
M1928
M1929
M1930
M1931
M1932
M1933
M1934
M1935
M1936
M1937
M1938
M1939
M1940
M1941
M1942
M1943
M1944
M1945
M1946
M1947
M1948
M1949
M1950
M1951
M1952
M1953
M1954
M1955
M1956
M1957
M1958
M1959
M1960
M1961
M1962
M1963
M1964
M1965
M1966
M1967
M1968
M1969
M1970
M1971
M1972
M1973
M1974
M1975
M1976
M1977
M1978
M1979
M1980
M1981
M1982
M1983
M1984
M1985
M1986
M1987
M1988
M1989
M1990
M1991
M1992
M1993
M1994
M1995
M1996
M1997
M1998
M1999
M2000
M2001
M2002
M2003
M2004
M2005
M2006
M2007
M2008
M2009
M2010
M2011
M2012
M2013
M2014
M2015
M2016
M2017
M2018
M2019
M2020
M2021
M2022
M2023
M2024
M2025
M2026
M2027
M2028
M2029
M2030
M2031
M2032
M2033
M2034
M2035
M2036
M2037
M2038
M2039
M2040
M2041
M2042
M2043
M2044
M2045
M2046
M2047
M2048
M2049
M2050
M2051
M2052
M2053
M2054
M2055
M2056
M2057
M2058
M2059
M20
```



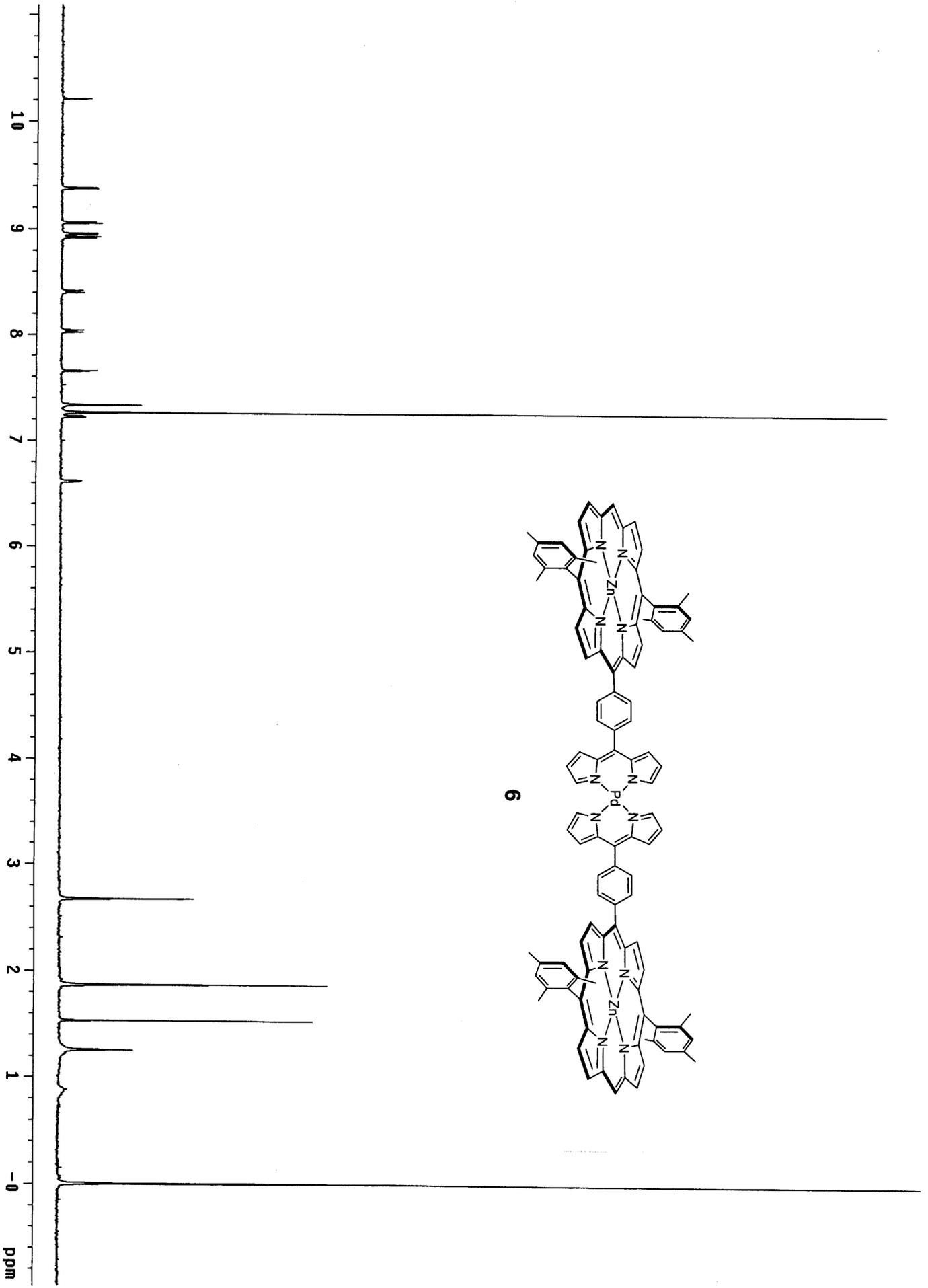


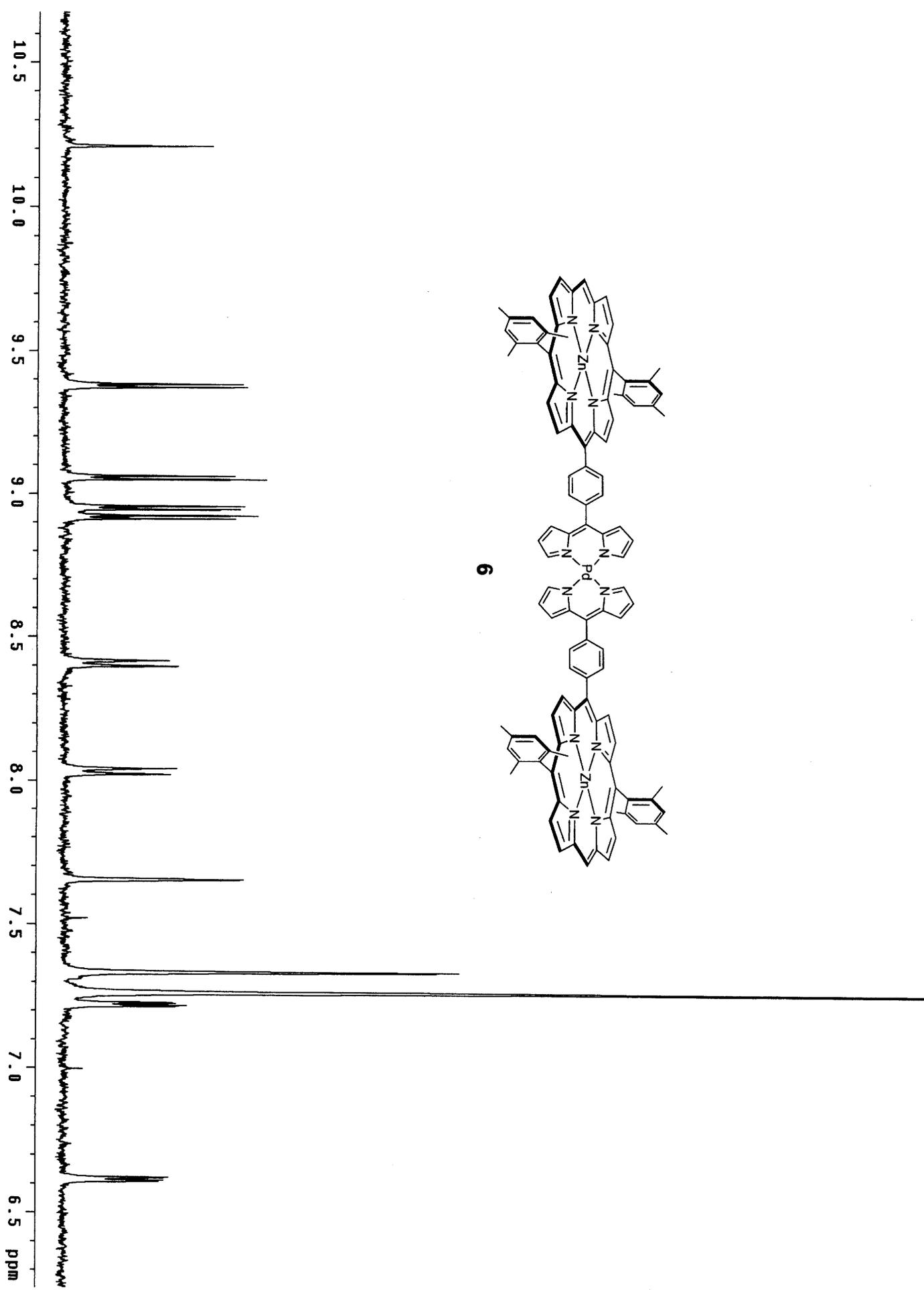
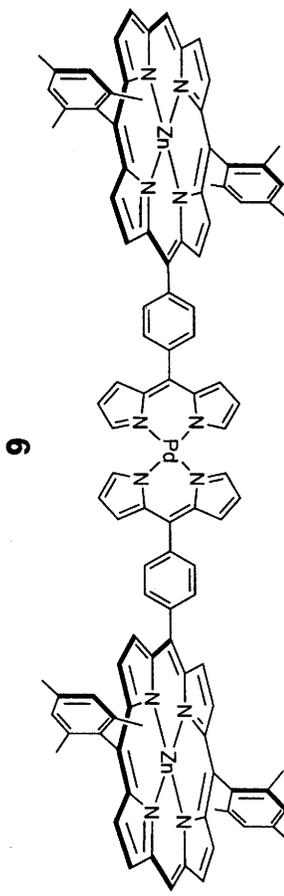


735.90



INSTRUM TOP
 OPID N. SriLavanan
 SRRNAM 015781
 AC DATE Wed Oct 24 17:38:10 2001
 PATH /data/chemistry/LINDSEY/LIANHE
 POLARI POS
 ACQ_M Reflector
 NO SHORT 3000
 SKORUM 62
 SMOPTS1 1
 SMOPTS2 4
 SMOPTS3 0
 DM 0
 TIME 1.00 [ms]
 U1s1 20.00 [KV]
 U1s2 18.70 [KV]
 U1e1 0.00 [KV]
 U1e2 7.50 [KV]
 U1e3 10.00 [KV]
 U1e4 0.00 [KV]
 U1e5 0.00 [KV]
 U1e6 0.00 [KV]
 U1e7 2.00 [KV]
 U1e8 1.00 [Hz]
 REPRZ 42.0
 ATTEM 1
 M1 2067125.193
 M2 333.982
 M3 0.000
 M4
 M5
 M6
 M7
 M8
 M9
 M10
 M11
 M12
 M13
 M14
 M15
 M16
 M17
 M18
 M19
 M20
 M21
 M22
 M23
 M24
 M25
 M26
 M27
 M28
 M29
 M30
 M31
 M32
 M33
 M34
 M35
 M36
 M37
 M38
 M39
 M40
 M41
 M42
 M43
 M44
 M45
 M46
 M47
 M48
 M49
 M50
 M51
 M52
 M53
 M54
 M55
 M56
 M57
 M58
 M59
 M60
 M61
 M62
 M63
 M64
 M65
 M66
 M67
 M68
 M69
 M70
 M71
 M72
 M73
 M74
 M75
 M76
 M77
 M78
 M79
 M80
 M81
 M82
 M83
 M84
 M85
 M86
 M87
 M88
 M89
 M90
 M91
 M92
 M93
 M94
 M95
 M96
 M97
 M98
 M99
 M100
 M101
 M102
 M103
 M104
 M105
 M106
 M107
 M108
 M109
 M110
 M111
 M112
 M113
 M114
 M115
 M116
 M117
 M118
 M119
 M120
 M121
 M122
 M123
 M124
 M125
 M126
 M127
 M128
 M129
 M130
 M131
 M132
 M133
 M134
 M135
 M136
 M137
 M138
 M139
 M140
 M141
 M142
 M143
 M144
 M145
 M146
 M147
 M148
 M149
 M150
 M151
 M152
 M153
 M154
 M155
 M156
 M157
 M158
 M159
 M160
 M161
 M162
 M163
 M164
 M165
 M166
 M167
 M168
 M169
 M170
 M171
 M172
 M173
 M174
 M175
 M176
 M177
 M178
 M179
 M180
 M181
 M182
 M183
 M184
 M185
 M186
 M187
 M188
 M189
 M190
 M191
 M192
 M193
 M194
 M195
 M196
 M197
 M198
 M199
 M200
 M201
 M202
 M203
 M204
 M205
 M206
 M207
 M208
 M209
 M210
 M211
 M212
 M213
 M214
 M215
 M216
 M217
 M218
 M219
 M220
 M221
 M222
 M223
 M224
 M225
 M226
 M227
 M228
 M229
 M230
 M231
 M232
 M233
 M234
 M235
 M236
 M237
 M238
 M239
 M240
 M241
 M242
 M243
 M244
 M245
 M246
 M247
 M248
 M249
 M250
 M251
 M252
 M253
 M254
 M255
 M256
 M257
 M258
 M259
 M260
 M261
 M262
 M263
 M264
 M265
 M266
 M267
 M268
 M269
 M270
 M271
 M272
 M273
 M274
 M275
 M276
 M277
 M278
 M279
 M280
 M281
 M282
 M283
 M284
 M285
 M286
 M287
 M288
 M289
 M290
 M291
 M292
 M293
 M294
 M295
 M296
 M297
 M298
 M299
 M300
 M301
 M302
 M303
 M304
 M305
 M306
 M307
 M308
 M309
 M310
 M311
 M312
 M313
 M314
 M315
 M316
 M317
 M318
 M319
 M320
 M321
 M322
 M323
 M324
 M325
 M326
 M327
 M328
 M329
 M330
 M331
 M332
 M333
 M334
 M335
 M336
 M337
 M338
 M339
 M340
 M341
 M342
 M343
 M344
 M345
 M346
 M347
 M348
 M349
 M350
 M351
 M352
 M353
 M354
 M355
 M356
 M357
 M358
 M359
 M360
 M361
 M362
 M363
 M364
 M365
 M366
 M367
 M368
 M369
 M370
 M371
 M372
 M373
 M374
 M375
 M376
 M377
 M378
 M379
 M380
 M381
 M382
 M383
 M384
 M385
 M386
 M387
 M388
 M389
 M390
 M391
 M392
 M393
 M394
 M395
 M396
 M397
 M398
 M399
 M400
 M401
 M402
 M403
 M404
 M405
 M406
 M407
 M408
 M409
 M410
 M411
 M412
 M413
 M414
 M415
 M416
 M417
 M418
 M419
 M420
 M421
 M422
 M423
 M424
 M425
 M426
 M427
 M428
 M429
 M430
 M431
 M432
 M433
 M434
 M435
 M436
 M437
 M438
 M439
 M440
 M441
 M442
 M443
 M444
 M445
 M446
 M447
 M448
 M449
 M450
 M451
 M452
 M453
 M454
 M455
 M456
 M457
 M458
 M459
 M460
 M461
 M462
 M463
 M464
 M465
 M466
 M467
 M468
 M469
 M470
 M471
 M472
 M473
 M474
 M475
 M476
 M477
 M478
 M479
 M480
 M481
 M482
 M483
 M484
 M485
 M486
 M487
 M488
 M489
 M490
 M491
 M492
 M493
 M494
 M495
 M496
 M497
 M498
 M499
 M500
 M501
 M502
 M503
 M504
 M505
 M506
 M507
 M508
 M509
 M510
 M511
 M512
 M513
 M514
 M515
 M516
 M517
 M518
 M519
 M520
 M521
 M522
 M523
 M524
 M525
 M526
 M527
 M528
 M529
 M530
 M531
 M532
 M533
 M534
 M535
 M536
 M537
 M538
 M539
 M540
 M541
 M542
 M543
 M544
 M545
 M546
 M547
 M548
 M549
 M550
 M551
 M552
 M553
 M554
 M555
 M556
 M557
 M558
 M559
 M560
 M561
 M562
 M563
 M564
 M565
 M566
 M567
 M568
 M569
 M570
 M571
 M572
 M573
 M574
 M575
 M576
 M577
 M578
 M579
 M580
 M581
 M582
 M583
 M584
 M585
 M586
 M587
 M588
 M589
 M590
 M591
 M592
 M593
 M594
 M595
 M596
 M597
 M598
 M599
 M600
 M601
 M602
 M603
 M604
 M605
 M606
 M607
 M608
 M609
 M610
 M611
 M612
 M613
 M614
 M615
 M616
 M617
 M618
 M619
 M620
 M621
 M622
 M623
 M624
 M625
 M626
 M627
 M628
 M629
 M630
 M631
 M632
 M633
 M634
 M635
 M636
 M637
 M638
 M639
 M640
 M641
 M642
 M643
 M644
 M645
 M646
 M647
 M648
 M649
 M650
 M651
 M652
 M653
 M654
 M655
 M656
 M657
 M658
 M659
 M660
 M661
 M662
 M663
 M664
 M665
 M666
 M667
 M668
 M669
 M670
 M671
 M672
 M673
 M674
 M675
 M676
 M677
 M678
 M679
 M680
 M681
 M682
 M683
 M684
 M685
 M686
 M687
 M688
 M689
 M690
 M691
 M692
 M693
 M694
 M695
 M696
 M697
 M698
 M699
 M700
 M701
 M702
 M703
 M704
 M705
 M706
 M707
 M708
 M709
 M710
 M711
 M712
 M713
 M714
 M715
 M716
 M717
 M718
 M719
 M720
 M721
 M722
 M723
 M724
 M725
 M726
 M727
 M728
 M729
 M730
 M731
 M732
 M733
 M734
 M735
 M736
 M737
 M738
 M739
 M740
 M741
 M742
 M743
 M744
 M745
 M746
 M747
 M748
 M749
 M750
 M751
 M752
 M753
 M754
 M755
 M756
 M757
 M758
 M759
 M760
 M761
 M762
 M763
 M764
 M765
 M766
 M767
 M768
 M769
 M770
 M771
 M772
 M773
 M774
 M775
 M776
 M777
 M778
 M779
 M780
 M781
 M782
 M783
 M784
 M785
 M786
 M787
 M788
 M789
 M790
 M791
 M792
 M793
 M794
 M795
 M796
 M797
 M798
 M799
 M800
 M801
 M802
 M803
 M804
 M805
 M806
 M807
 M808
 M809
 M810
 M811
 M812
 M813
 M814
 M815
 M816
 M817
 M818
 M819
 M820
 M821
 M822
 M823
 M824
 M825
 M826
 M827
 M828
 M829
 M830
 M831
 M832
 M833
 M834
 M835
 M836
 M837
 M838
 M839
 M840
 M841
 M842
 M843
 M844
 M845
 M846
 M847
 M848
 M849
 M850
 M851
 M852
 M853
 M854
 M855
 M856
 M857
 M858
 M859
 M860
 M861
 M862
 M863
 M864
 M865
 M866
 M867
 M868
 M869
 M870
 M871
 M872
 M873
 M874
 M875
 M876
 M877
 M878
 M879
 M880
 M881
 M882
 M883
 M884
 M885
 M886
 M887
 M888
 M889
 M890
 M891
 M892
 M893
 M894
 M895
 M896
 M897
 M898
 M899
 M900
 M901
 M902
 M903
 M904
 M905
 M906
 M907
 M908
 M909
 M910
 M911
 M912
 M913
 M914
 M915
 M916
 M917
 M918
 M919
 M920
 M921
 M922
 M923
 M924
 M925
 M926
 M927
 M928
 M929
 M930
 M931
 M932
 M933
 M934
 M935
 M936
 M937
 M938
 M939
 M940
 M941
 M942
 M943
 M944
 M945
 M946
 M947
 M948
 M949
 M950
 M951
 M952
 M953
 M954
 M955
 M956
 M957
 M958
 M959
 M960
 M961
 M962
 M963
 M964
 M965
 M966
 M967
 M968
 M969
 M970
 M971
 M972
 M973
 M974
 M975
 M976
 M977
 M978
 M979
 M980
 M981
 M982
 M983
 M984
 M985
 M986
 M987
 M988
 M989
 M990
 M991
 M992
 M993
 M994
 M995
 M996
 M997
 M998
 M999
 M1000





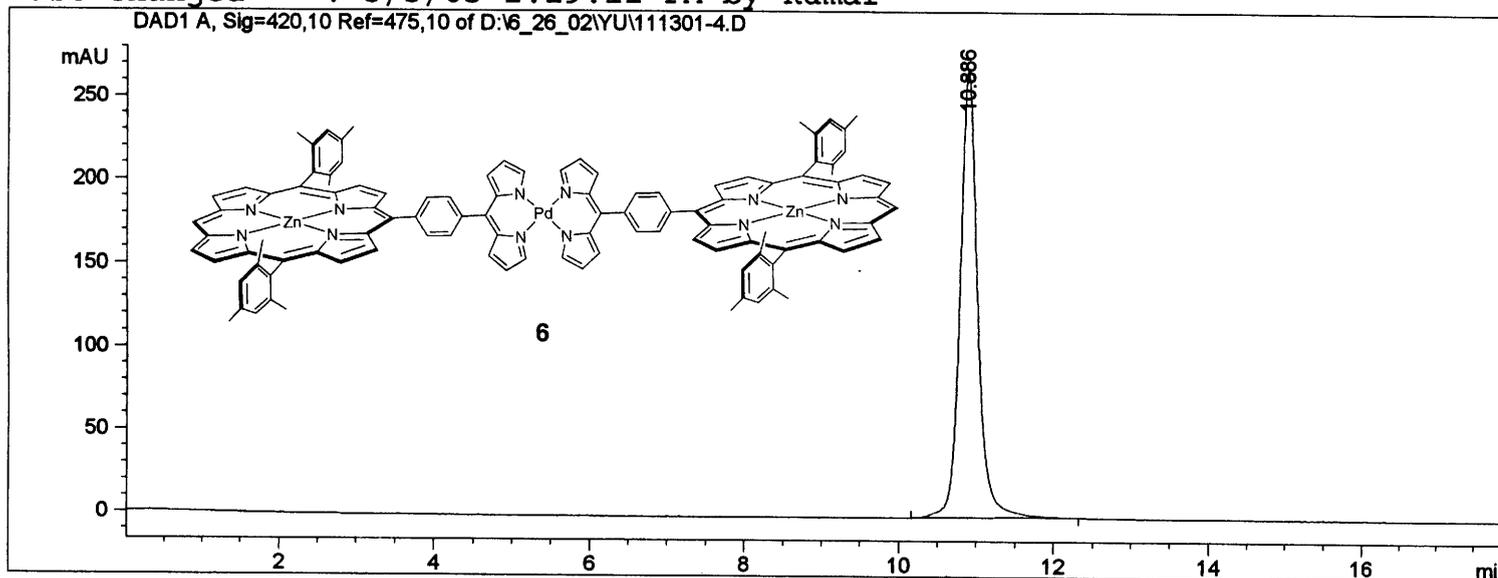
Suzuki coupling, Ba(OH)₂, DME/H₂O, 80 oC 15 h
 After short silica column
 SEC, 2nd F (Product)

```

=====
Injection Date   : 11/13/01 1:11:02 PM           Seq. Line :    -
Sample Name     : Suzuki-BaOH                   Vial      :   100
Acq. Operator  : LHY                           Inj       :    -
                                                    Inj Volume:  20 µl
  
```

```

Acq. Method     : C:\HPCHEM\1\METHODS\YLH.M
Last changed    : 11/13/01 8:55:56 AM by LHY
Analysis Method : C:\HPCHEM\1\METHODS\YU-DP.M
Last changed    : 3/3/03 2:19:11 PM by Kumar
  
```



```

=====
                          Area Percent Report
=====
  
```

Sorted by Signal

```

Multiplier      :      1.000000
Dilution        :      1.000000
  
```

Signal 1: DAD1 A, Sig=420,10 Ref=475,10

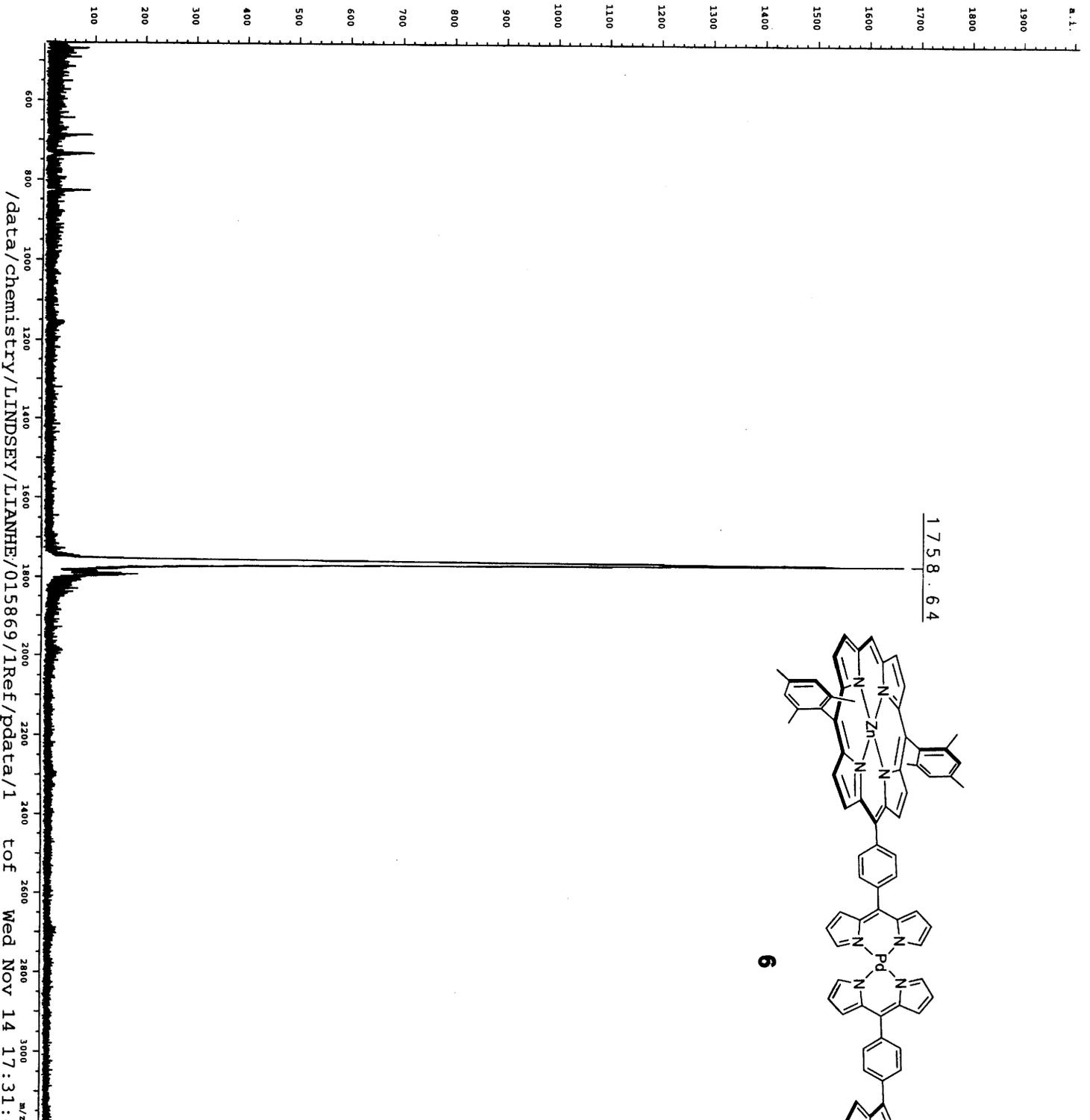
Peak #	RT [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	10.886	BB	0.242	4294.34668	268.53076	100.0000

```
Totals :                      4294.34668      268.53076
```

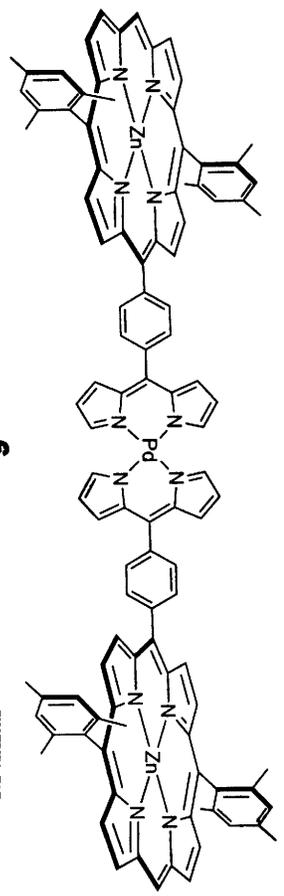
```

=====
*** End of Report ***
  
```

Analytical SEC trace of triad-6



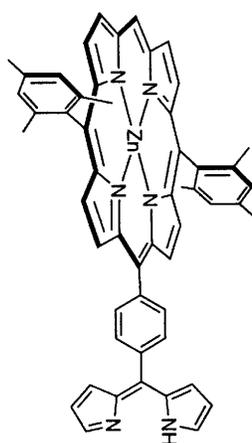
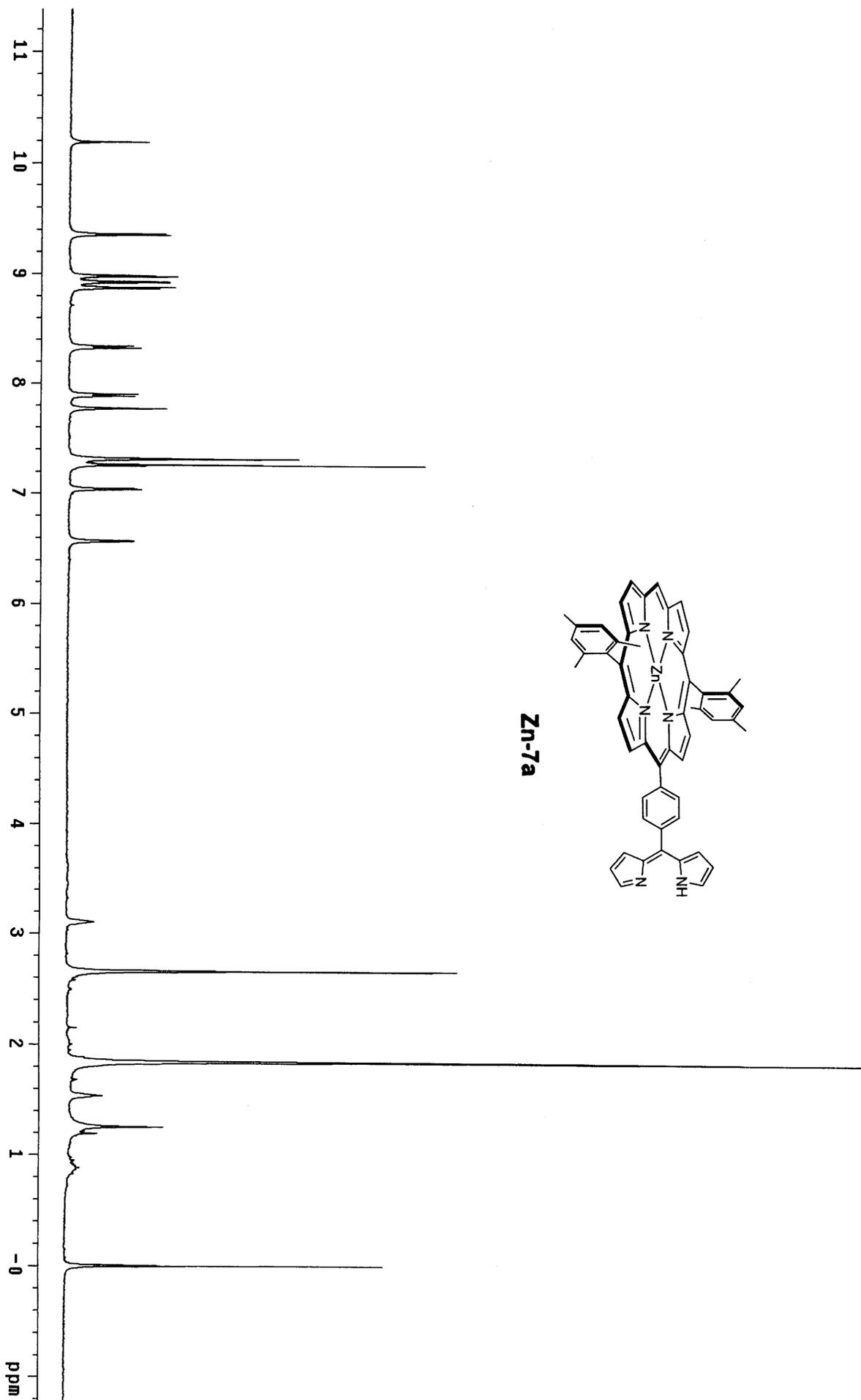
/data/chemistry/LINDSEY/LIANHE/015869/1Ref/pdata/1 tof Wed Nov 14 17:31:41 2001



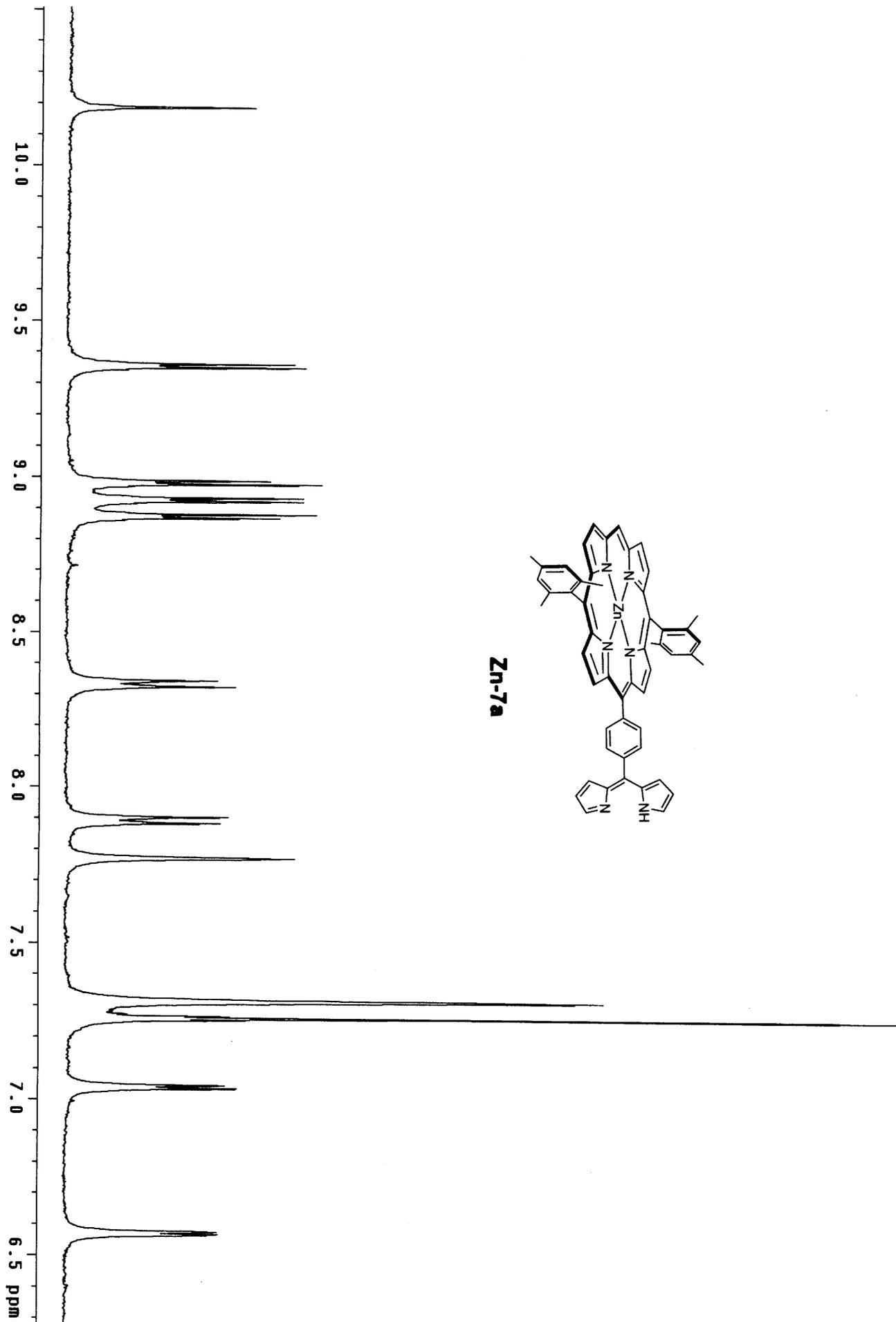
```

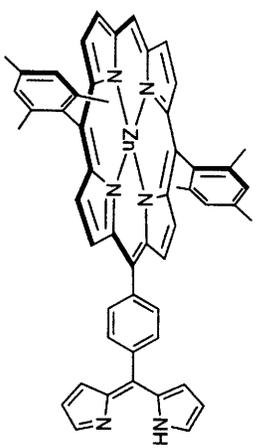
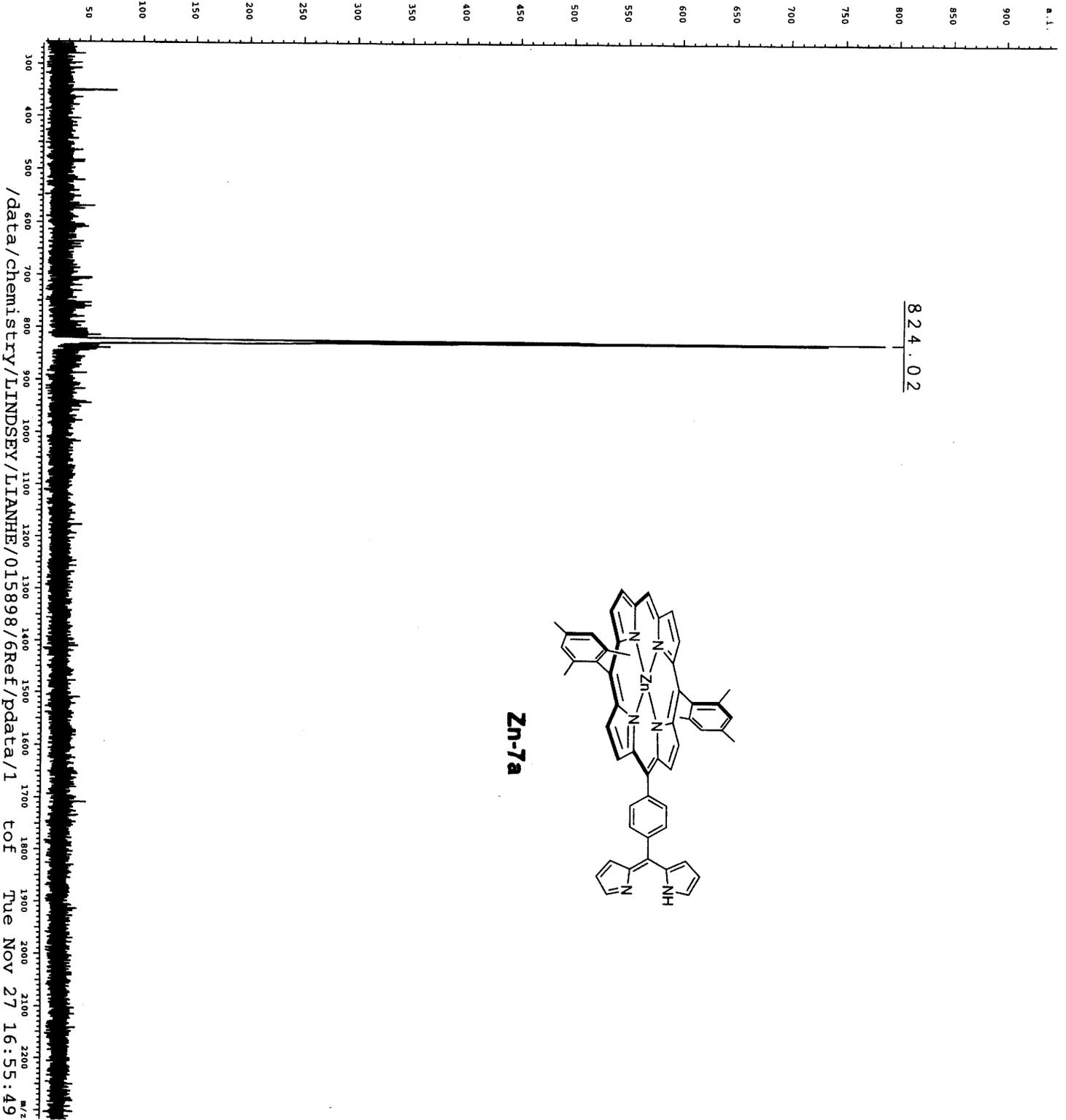
INSTRUM TOP
ORIG N: SPINIVASANA
SRNAM 015869
AC DATE Wed Nov 14 17:34:12 2001
PATH /data/chemistry/LINDSEY/LIANHE
POLARI POS
APC2_m Reflector
APC2 4000
NOISORTS 71
SNOPT91 0
SNOPT92 0
SNOPT93 0
DM 1.00 [ms]
DM2 0 [ms]
DM3 20.00 [KV]
Ura2 18.70 [KV]
Urae1 7.50 [KV]
Urae2 10.00 [KV]
Urae3 0.00 [KV]
Urae4 1.50 [KV]
Urae5 2.00 [KV]
REPHZ 1.00 [Hz]
ATTEN 37.0
M1 2071659.729
M2 333.982
M3 0.000
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M19
M20
M21
M22
M23
M24
M25
M26
M27
M28
M29
M30
M31
M32
M33
M34
M35
M36
M37
M38
M39
M40
M41
M42
M43
M44
M45
M46
M47
M48
M49
M50
M51
M52
M53
M54
M55
M56
M57
M58
M59
M60
M61
M62
M63
M64
M65
M66
M67
M68
M69
M70
M71
M72
M73
M74
M75
M76
M77
M78
M79
M80
M81
M82
M83
M84
M85
M86
M87
M88
M89
M90
M91
M92
M93
M94
M95
M96
M97
M98
M99
M100
M101
M102
M103
M104
M105
M106
M107
M108
M109
M110
M111
M112
M113
M114
M115
M116
M117
M118
M119
M120
M121
M122
M123
M124
M125
M126
M127
M128
M129
M130
M131
M132
M133
M134
M135
M136
M137
M138
M139
M140
M141
M142
M143
M144
M145
M146
M147
M148
M149
M150
M151
M152
M153
M154
M155
M156
M157
M158
M159
M160
M161
M162
M163
M164
M165
M166
M167
M168
M169
M170
M171
M172
M173
M174
M175
M176
M177
M178
M179
M180
M181
M182
M183
M184
M185
M186
M187
M188
M189
M190
M191
M192
M193
M194
M195
M196
M197
M198
M199
M200
M201
M202
M203
M204
M205
M206
M207
M208
M209
M210
M211
M212
M213
M214
M215
M216
M217
M218
M219
M220
M221
M222
M223
M224
M225
M226
M227
M228
M229
M230
M231
M232
M233
M234
M235
M236
M237
M238
M239
M240
M241
M242
M243
M244
M245
M246
M247
M248
M249
M250
M251
M252
M253
M254
M255
M256
M257
M258
M259
M260
M261
M262
M263
M264
M265
M266
M267
M268
M269
M270
M271
M272
M273
M274
M275
M276
M277
M278
M279
M280
M281
M282
M283
M284
M285
M286
M287
M288
M289
M290
M291
M292
M293
M294
M295
M296
M297
M298
M299
M300
M301
M302
M303
M304
M305
M306
M307
M308
M309
M310
M311
M312
M313
M314
M315
M316
M317
M318
M319
M320
M321
M322
M323
M324
M325
M326
M327
M328
M329
M330
M331
M332
M333
M334
M335
M336
M337
M338
M339
M340
M341
M342
M343
M344
M345
M346
M347
M348
M349
M350
M351
M352
M353
M354
M355
M356
M357
M358
M359
M360
M361
M362
M363
M364
M365
M366
M367
M368
M369
M370
M371
M372
M373
M374
M375
M376
M377
M378
M379
M380
M381
M382
M383
M384
M385
M386
M387
M388
M389
M390
M391
M392
M393
M394
M395
M396
M397
M398
M399
M400
M401
M402
M403
M404
M405
M406
M407
M408
M409
M410
M411
M412
M413
M414
M415
M416
M417
M418
M419
M420
M421
M422
M423
M424
M425
M426
M427
M428
M429
M430
M431
M432
M433
M434
M435
M436
M437
M438
M439
M440
M441
M442
M443
M444
M445
M446
M447
M448
M449
M450
M451
M452
M453
M454
M455
M456
M457
M458
M459
M460
M461
M462
M463
M464
M465
M466
M467
M468
M469
M470
M471
M472
M473
M474
M475
M476
M477
M478
M479
M480
M481
M482
M483
M484
M485
M486
M487
M488
M489
M490
M491
M492
M493
M494
M495
M496
M497
M498
M499
M500
M501
M502
M503
M504
M505
M506
M507
M508
M509
M510
M511
M512
M513
M514
M515
M516
M517
M518
M519
M520
M521
M522
M523
M524
M525
M526
M527
M528
M529
M530
M531
M532
M533
M534
M535
M536
M537
M538
M539
M540
M541
M542
M543
M544
M545
M546
M547
M548
M549
M550
M551
M552
M553
M554
M555
M556
M557
M558
M559
M560
M561
M562
M563
M564
M565
M566
M567
M568
M569
M570
M571
M572
M573
M574
M575
M576
M577
M578
M579
M580
M581
M582
M583
M584
M585
M586
M587
M588
M589
M590
M591
M592
M593
M594
M595
M596
M597
M598
M599
M600
M601
M602
M603
M604
M605
M606
M607
M608
M609
M610
M611
M612
M613
M614
M615
M616
M617
M618
M619
M620
M621
M622
M623
M624
M625
M626
M627
M628
M629
M630
M631
M632
M633
M634
M635
M636
M637
M638
M639
M640
M641
M642
M643
M644
M645
M646
M647
M648
M649
M650
M651
M652
M653
M654
M655
M656
M657
M658
M659
M660
M661
M662
M663
M664
M665
M666
M667
M668
M669
M670
M671
M672
M673
M674
M675
M676
M677
M678
M679
M680
M681
M682
M683
M684
M685
M686
M687
M688
M689
M690
M691
M692
M693
M694
M695
M696
M697
M698
M699
M700
M701
M702
M703
M704
M705
M706
M707
M708
M709
M710
M711
M712
M713
M714
M715
M716
M717
M718
M719
M720
M721
M722
M723
M724
M725
M726
M727
M728
M729
M730
M731
M732
M733
M734
M735
M736
M737
M738
M739
M740
M741
M742
M743
M744
M745
M746
M747
M748
M749
M750
M751
M752
M753
M754
M755
M756
M757
M758
M759
M760
M761
M762
M763
M764
M765
M766
M767
M768
M769
M770
M771
M772
M773
M774
M775
M776
M777
M778
M779
M780
M781
M782
M783
M784
M785
M786
M787
M788
M789
M790
M791
M792
M793
M794
M795
M796
M797
M798
M799
M800
M801
M802
M803
M804
M805
M806
M807
M808
M809
M810
M811
M812
M813
M814
M815
M816
M817
M818
M819
M820
M821
M822
M823
M824
M825
M826
M827
M828
M829
M830
M831
M832
M833
M834
M835
M836
M837
M838
M839
M840
M841
M842
M843
M844
M845
M846
M847
M848
M849
M850
M851
M852
M853
M854
M855
M856
M857
M858
M859
M860
M861
M862
M863
M864
M865
M866
M867
M868
M869
M870
M871
M872
M873
M874
M875
M876
M877
M878
M879
M880
M881
M882
M883
M884
M885
M886
M887
M888
M889
M890
M891
M892
M893
M894
M895
M896
M897
M898
M899
M900
M901
M902
M903
M904
M905
M906
M907
M908
M909
M910
M911
M912
M913
M914
M915
M916
M917
M918
M919
M920
M921
M922
M923
M924
M925
M926
M927
M928
M929
M930
M931
M932
M933
M934
M935
M936
M937
M938
M939
M940
M941
M942
M943
M944
M945
M946
M947
M948
M949
M950
M951
M952
M953
M954
M955
M956
M957
M958
M959
M960
M961
M962
M963
M964
M965
M966
M967
M968
M969
M970
M971
M972
M973
M974
M975
M976
M977
M978
M979
M980
M981
M982
M983
M984
M985
M986
M987
M988
M989
M990
M991
M992
M993
M994
M995
M996
M997
M998
M999
M1000
M1001
M1002
M1003
M1004
M1005
M1006
M1007
M1008
M1009
M1010
M1011
M1012
M1013
M1014
M1015
M1016
M1017
M1018
M1019
M1020
M1021
M1022
M1023
M1024
M1025
M1026
M1027
M1028
M1029
M1030
M1031
M1032
M1033
M1034
M1035
M1036
M1037
M1038
M1039
M1040
M1041
M1042
M1043
M1044
M1045
M1046
M1047
M1048
M1049
M1050
M1051
M1052
M1053
M1054
M1055
M1056
M1057
M1058
M1059
M1060
M1061
M1062
M1063
M1064
M1065
M1066
M1067
M1068
M1069
M1070
M1071
M1072
M1073
M1074
M1075
M1076
M1077
M1078
M1079
M1080
M1081
M1082
M1083
M1084
M1085
M1086
M1087
M1088
M1089
M1090
M1091
M1092
M1093
M1094
M1095
M1096
M1097
M1098
M1099
M1100
M1101
M1102
M1103
M1104
M1105
M1106
M1107
M1108
M1109
M1110
M1111
M1112
M1113
M1114
M1115
M1116
M1117
M1118
M1119
M1120
M1121
M1122
M1123
M1124
M1125
M1126
M1127
M1128
M1129
M1130
M1131
M1132
M1133
M1134
M1135
M1136
M1137
M1138
M1139
M1140
M1141
M1142
M1143
M1144
M1145
M1146
M1147
M1148
M1149
M1150
M1151
M1152
M1153
M1154
M1155
M1156
M1157
M1158
M1159
M1160
M1161
M1162
M1163
M1164
M1165
M1166
M1167
M1168
M1169
M1170
M1171
M1172
M1173
M1174
M1175
M1176
M1177
M1178
M1179
M1180
M1181
M1182
M1183
M1184
M1185
M1186
M1187
M1188
M1189
M1190
M1191
M1192
M1193
M1194
M1195
M1196
M1197
M1198
M1199
M1200
M1201
M1202
M1203
M1204
M1205
M1206
M1207
M1208
M1209
M1210
M1211
M1212
M1213
M1214
M1215
M1216
M1217
M1218
M1219
M1220
M1221
M1222
M1223
M1224
M1225
M1226
M1227
M1228
M1229
M1230
M1231
M1232
M1233
M1234
M1235
M1236
M1237
M1238
M1239
M1240
M1241
M1242
M1243
M1244
M1245
M1246
M1247
M1248
M1249
M1250
M1251
M1252
M1253
M1254
M1255
M1256
M1257
M1258
M1259
M1260
M1261
M1262
M1263
M1264
M1265
M1266
M1267
M1268
M1269
M1270
M1271
M1272
M1273
M1274
M1275
M1276
M1277
M1278
M1279
M1280
M1281
M1282
M1283
M1284
M1285
M1286
M1287
M1288
M1289
M1290
M1291
M1292
M1293
M1294
M1295
M1296
M1297
M1298
M1299
M1300
M1301
M1302
M1303
M1304
M1305
M1306
M1307
M1308
M1309
M1310
M1311
M1312
M1313
M1314
M1315
M1316
M1317
M1318
M1319
M1320
M1321
M1322
M1323
M1324
M1325
M1326
M1327
M1328
M1329
M1330
M1331
M1332
M1333
M1334
M1335
M1336
M1337
M1338
M1339
M1340
M1341
M1342
M1343
M1344
M1345
M1346
M1347
M1348
M1349
M1350
M1351
M1352
M1353
M1354
M1355
M1356
M1357
M1358
M1359
M1360
M1361
M1362
M1363
M1364
M1365
M1366
M1367
M1368
M1369
M1370
M1371
M1372
M1373
M1374
M1375
M1376
M1377
M1378
M1379
M1380
M1381
M1382
M1383
M1384
M1385
M1386
M1387
M1388
M1389
M1390
M1391
M1392
M1393
M1394
M1395
M1396
M1397
M1398
M1399
M1400
M1401
M1402
M1403
M1404
M1405
M1406
M1407
M1408
M1409
M1410
M1411
M1412
M1413
M1414
M1415
M1416
M1417
M1418
M1419
M1420
M1421
M1422
M1423
M1424
M1425
M1426
M1427
M1428
M1429
M1430
M1431
M1432
M1433
M1434
M1435
M1436
M1437
M1438
M1439
M1440
M1441
M1442
M1443
M1444
M1445
M1446
M1447
M1448
M1449
M1450
M1451
M1452
M1453
M1454
M1455
M1456
M1457
M1458
M1459
M1460
M1461
M1462
M1463
M1464
M1465
M1466
M1467
M1468
M1469
M1470
M1471
M1472
M1473
M1474
M1475
M1476
M1477
M1478
M1479
M1480
M1481
M1482
M1483
M1484
M1485
M1486
M1487
M1488
M1489
M1490
M1491
M1492
M1493
M1494
M1495
M1496
M1497
M1498
M1499
M1500
M1501
M1502
M1503
M1504
M1505
M1506
M1507
M1508
M1509
M1510
M1511
M1512
M1513
M1514
M1515
M1516
M1517
M1518
M1519
M1520
M1521
M1522
M1523
M1524
M1525
M1526
M1527
M1528
M1529
M1530
M1531
M1532
M1533
M1534
M1535
M1536
M1537
M1538
M1539
M1540
M1541
M1542
M1543
M1544
M1545
M1546
M1547
M1548
M1549
M1550
M1551
M1552
M1553
M1554
M1555
M1556
M1557
M1558
M1559
M1560
M1561
M1562
M1563
M1564
M1565
M1566
M1567
M1568
M1569
M1570
M1571
M1572
M1573
M1574
M1575
M1576
M1577
M1578
M1579
M1580
M1581
M1582
M1583
M1584
M1585
M1586
M1587
M1588
M1589
M1590
M1591
M1592
M1593
M1594
M1595
M1596
M1597
M1598
M1599
M1600
M1601
M1602
M1603
M1604
M1605
M1606
M1607
M1608
M1609
M1610
M1611
M1612
M1613
M1614
M1615
M1616
M1617
M1618
M1619
M1620
M1621
M1622
M1623
M1624
M1625
M1626
M1627
M1628
M1629
M1630
M1631
M1632
M1633
M1634
M1635
M1636
M1637
M1638
M1639
M1640
M1641
M1642
M1643
M1644
M1645
M1646
M1647
M1648
M1649
M1650
M1651
M1652
M1653
M1654
M1655
M1656
M1657
M1658
M1659
M1660
M1661
M1662
M1663
M1664
M1665
M1666
M1667
M1668
M1669
M1670
M1671
M1672
M1673
M1674
M1675
M1676
M1677
M1678
M1679
M1680
M1681
M1682
M1683
M1684
M1685
M1686
M1687
M1688
M1689
M1690
M1691
M1692
M1693
M1694
M1695
M1696
M1697
M1698
M1699
M1700
M1701
M1702
M1703
M1704
M1705
M1706
M1707
M1708
M1709
M1710
M1711
M1712
M1713
M1714
M1715
M1716
M1717
M1718
M1719
M1720
M1721
M1722
M1723
M1724
M1725
M1726
M1727
M1728
M1729
M1730
M1731
M1732
M1733
M1734
M1735
M1736
M1737
M1738
M1739
M1740
M1741
M1742
M1743
M1744
M1745
M1746
M1747
M1748
M1749
M1750
M1751
M1752
M1753
M1754
M1755
M1756
M1757
M1758
M1759
M1760
M1761
M1762
M1763
M1764
M1765
M1766
M1767
M1768
M1769
M1770
M1771
M1772
M1773
M1774
M1775
M1776
M1777
M1778
M1779
M1780
M1781
M1782
M1783
M1784
M1785
M1786
M1787
M1788
M1789
M1790
M1791
M1792
M1793
M1794
M1795
M1796
M1797
M1798
M1799
M1800
M1801
M1802
M1803
M1804
M1805
M1806
M1807
M1808
M1809
M1810
M1811
M1812
M1813
M1814
M1815
M1816
M1817
M1818
M1819
M1820
M1821
M1822
M1823
M1824
M1825
M1826
M1827
M1828
M1829
M1830
M1831
M1832
M1833
M1834
M1835
M1836
M1837
M1838
M1839
M1840
M1841
M1842
M1843
M1844
M1845
M1846
M1847
M1848
M1849
M1850
M1851
M1852
M1853
M1854
M1855
M1856
M1857
M1858
M1859
M1860
M1861
M1862
M1863
M1864
M1865
M1866
M1867
M1868
M1869
M1870
M1871
M1872
M1873
M1874
M1875
M1876
M1877
M1878
M1879
M1880
M1881
M1882
M1883
M1884
M1885
M1886
M1887
M1888
M1889
M1890
M1891
M1892
M1893
M1894
M1895
M1896
M1897
M1898
M1899
M1900
M1901
M1902
M1903
M1904
M1905
M1906
M1907
M1908
M1909
M1910
M1911
M1912
M1913
M1914
M1915
M1916
M1917
M1918
M1919
M1920
M1921
M1922
M1923
M1924
M1925
M1926
M1927
M1928
M1929
M1930
M1931
M1932
M1933
M1934
M1935
M1936
M1937
M1938
M1939
M1940
M1941
M1942
M1943
M1944
M1945
M1946
M1947
M1948
M1949
M1950
M1951
M1952
M1953
M1954
M1955
M1956
M1957
M1958
M1959
M1960
M1961
M1962
M1963
M1964
M1965
M1966
M1967
M1968
M1969
M1970
M1971
M1972
M1973
M1974
M1975
M1976
M1977
M1978
M1979
M1980
M1981
M1982
M1983
M1984
M1985
M1986
M1987
M1988
M1989
M1990
M1991
M1992
M1993
M1994
M1995
M1996
M1997
M1998
M1999
M2000
M2001
M2002
M2003
M2004
M2005
M2006
M2007
M2008
M2009
M2010
M2011
M2012
M2013
M2014
M2015
M2016
M2017
M2018
M2019
M2020
M2021
M2022
M2023
M2024
M2025
M2026
M2027
M2028
M2029
M2030
M2031
M2032
M2033
M2034
M2035
M2036
M2037
M2038
M2039
M2040
M2041
M2042
M2043
M2044
M2045
M2046
M2047
M2048
M2049
M2050
M2051
M2052
M2053
M2054
M2055
M2056
M2057
M2058
M2059
M2060
M2061
M2062
M2063
M2064
M2065
M2066
M2067
M2068
M2069
M2070
M2071
M2072
M2073
M2074
M2075
M2076
M2077
M2078
M2079
M2080
M2081
M2082
M2083
M2084
M2085
M2086
M2087
M2088
M2089
M2090
M2091
M2092
M2093
M2094
M2095
M2096
M2097
M2098
M2099
M2100
M2101
M2102
M2103
M2104
M2105
M2106
M2107
M2108
M2109
M2110
M2111
M2112
M2113
M2114
M2115
M2116
M2117
M2118
M2119
M2120
M2121
M2122
M2123
M2124
M2125
M2126
M2127
M2128
M2129
M2130
M2131
M2132
M2133
M2134
M2135
M2136
M2137
M2138
M2139
M2140

```



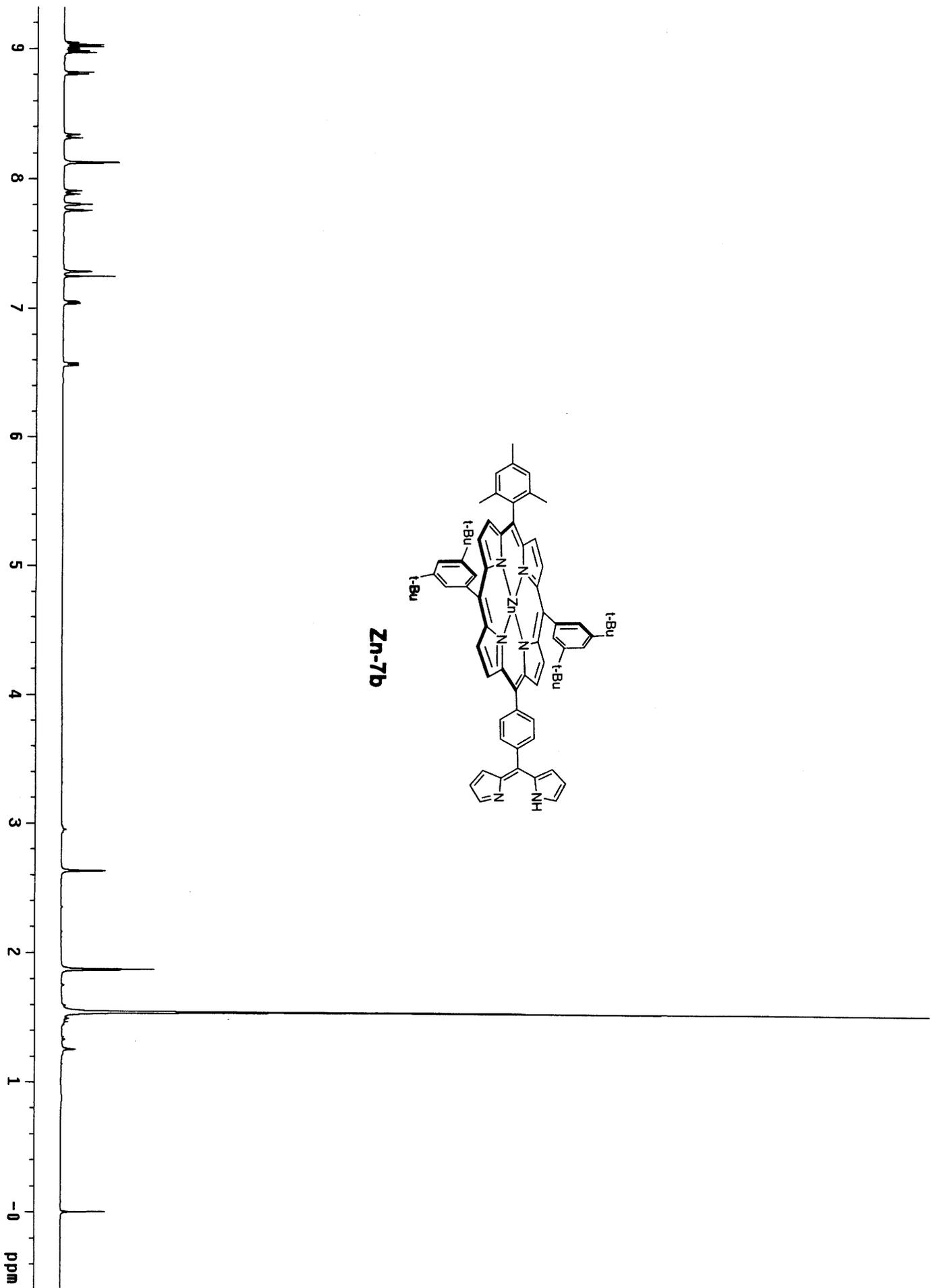
Zn-7a

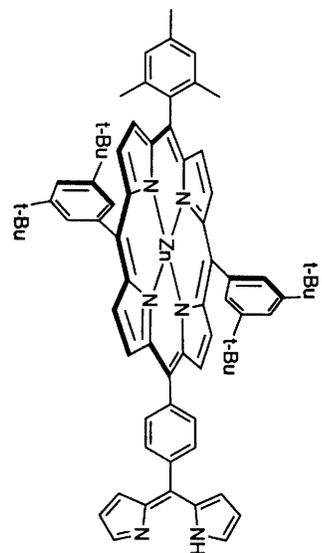




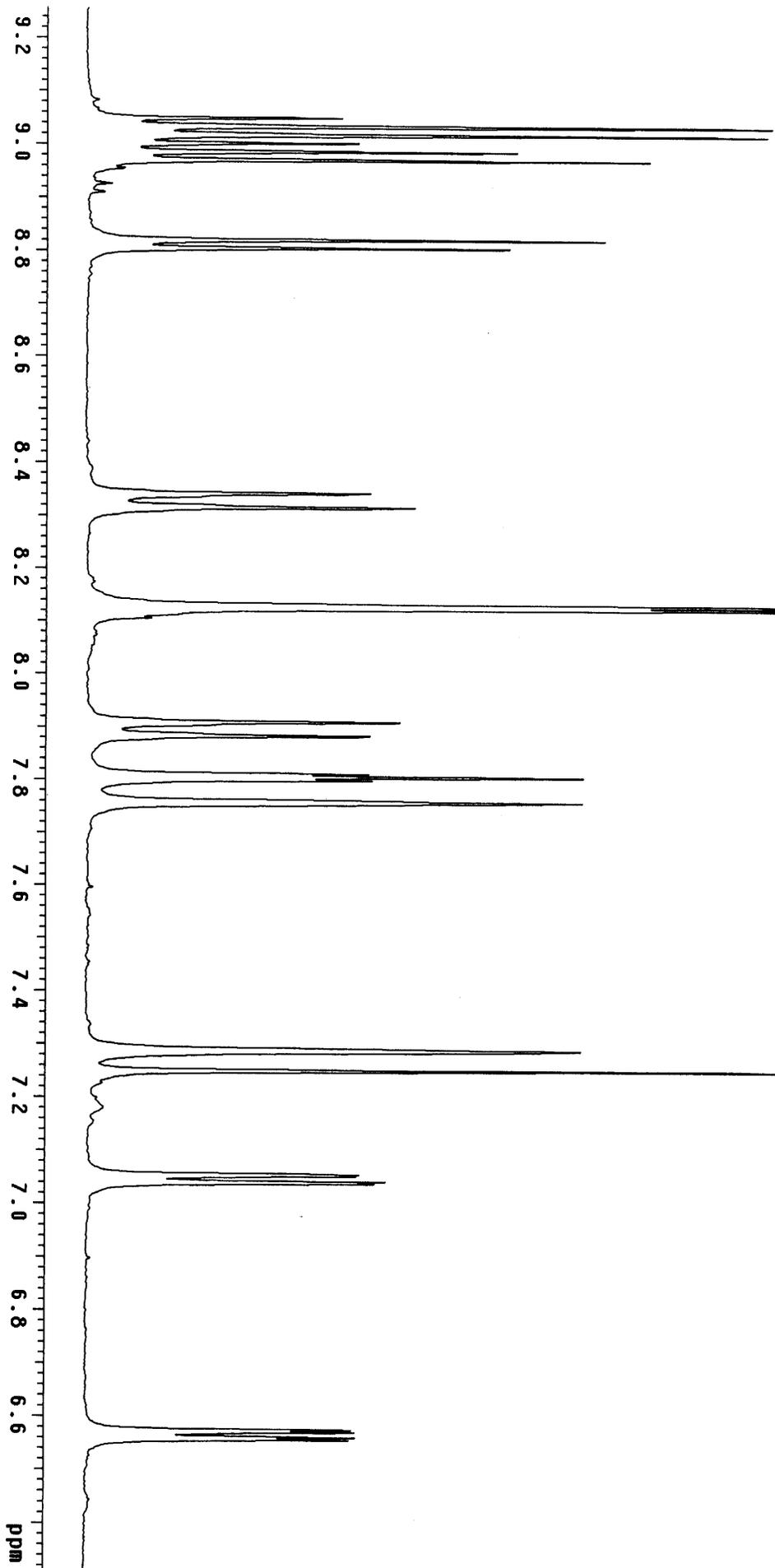
```

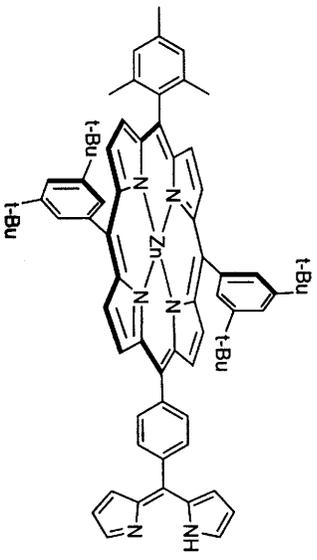
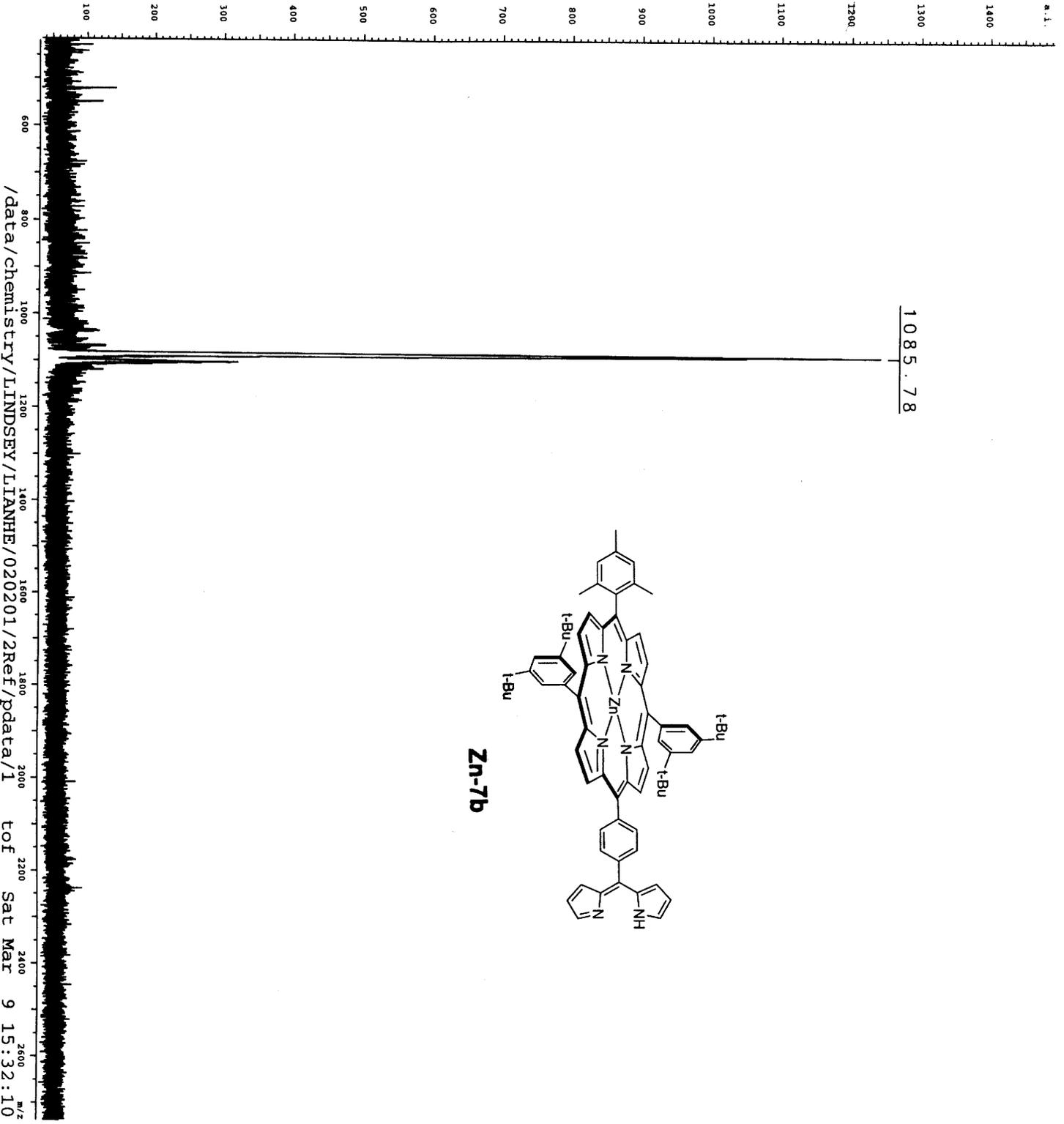
INSTRUM TOP
OPID N. Srinivasan
SERIAL 015898
AQ DATE Tue Nov 27 16:55:30 2001
PATH /data/chemistry/LINDSEY/LIANHE
POLK1 POS
POLK2 POS
TM RelSector
NO 40000
NOSHOTS 100
SMOFTS1 0
SMOFTS2 0
SMOFTS3 0
PM DELAY 0 1.00 [ns]
UIa1 20.00 [kV]
UIa2 18.70 [kV]
UIe1 0.00 [kV]
UIe2 7.50 [kV]
UImass 10.00 [kV]
REFTULL 0.00 [kV]
Udacr 0.00 [kV]
Udacr 2.00 [kV]
REPHZ 1.00 [Hz]
AYTEN 45.0
ML1 2067125.193
ML2 333.982
ML3 0.000
HITPRO NO
GIBSON YES
GDBELY short
DEFLON no
FLNSRD no
FLNSRD no
DTSZRD no
DTSZRD no
DPMAS 518.84 [Da]
RENDVAL 700.00 [Da]
LBNVAL 0.33
ISZBNV 0.28
ISZBNV 0.91
ZAPZn+DTM, CC, pure
CMT1
CMT2
atn = 45, shot = 100
  
```





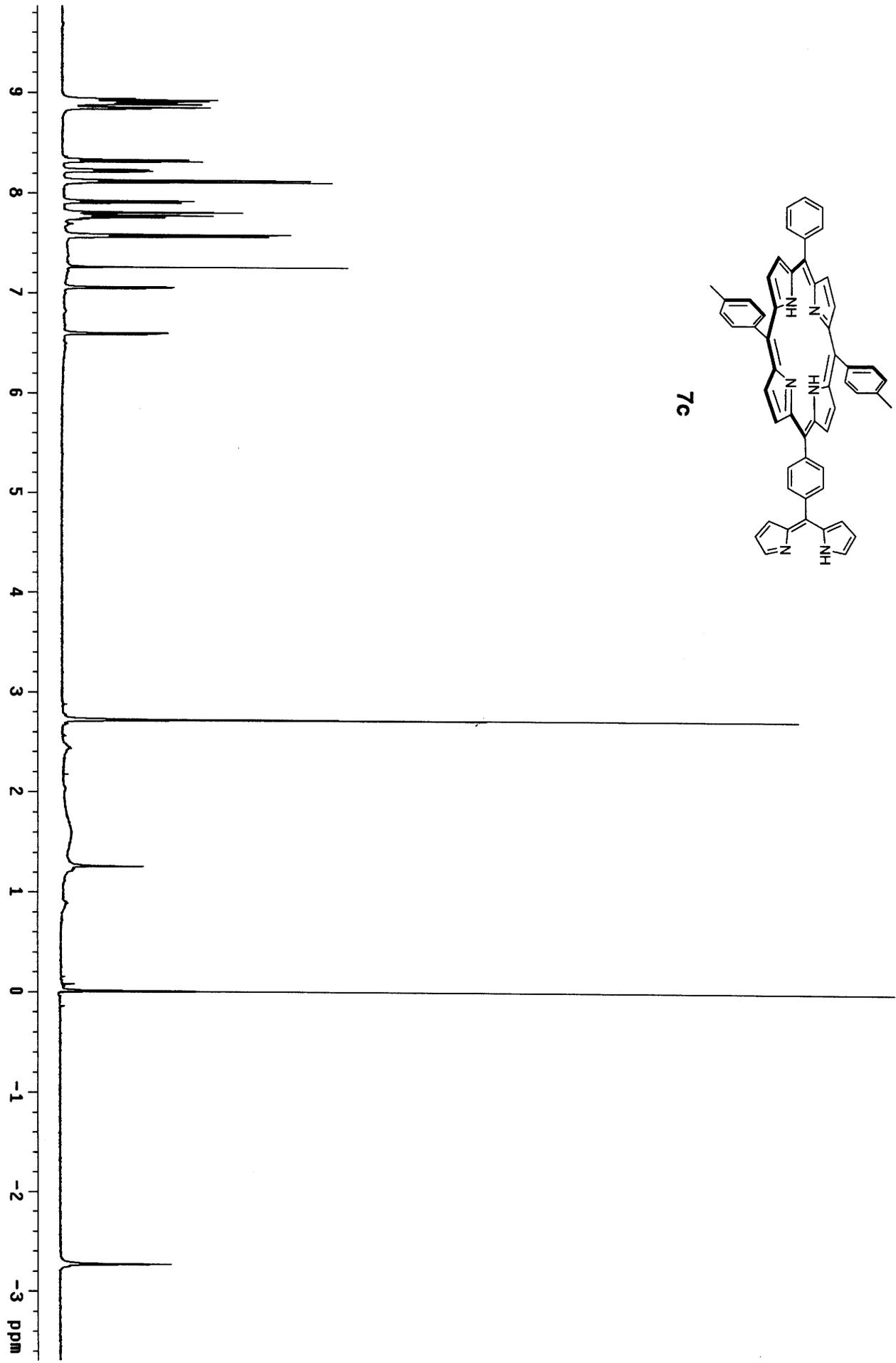
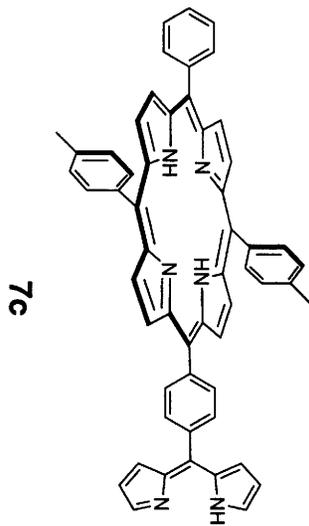
Zn-7b

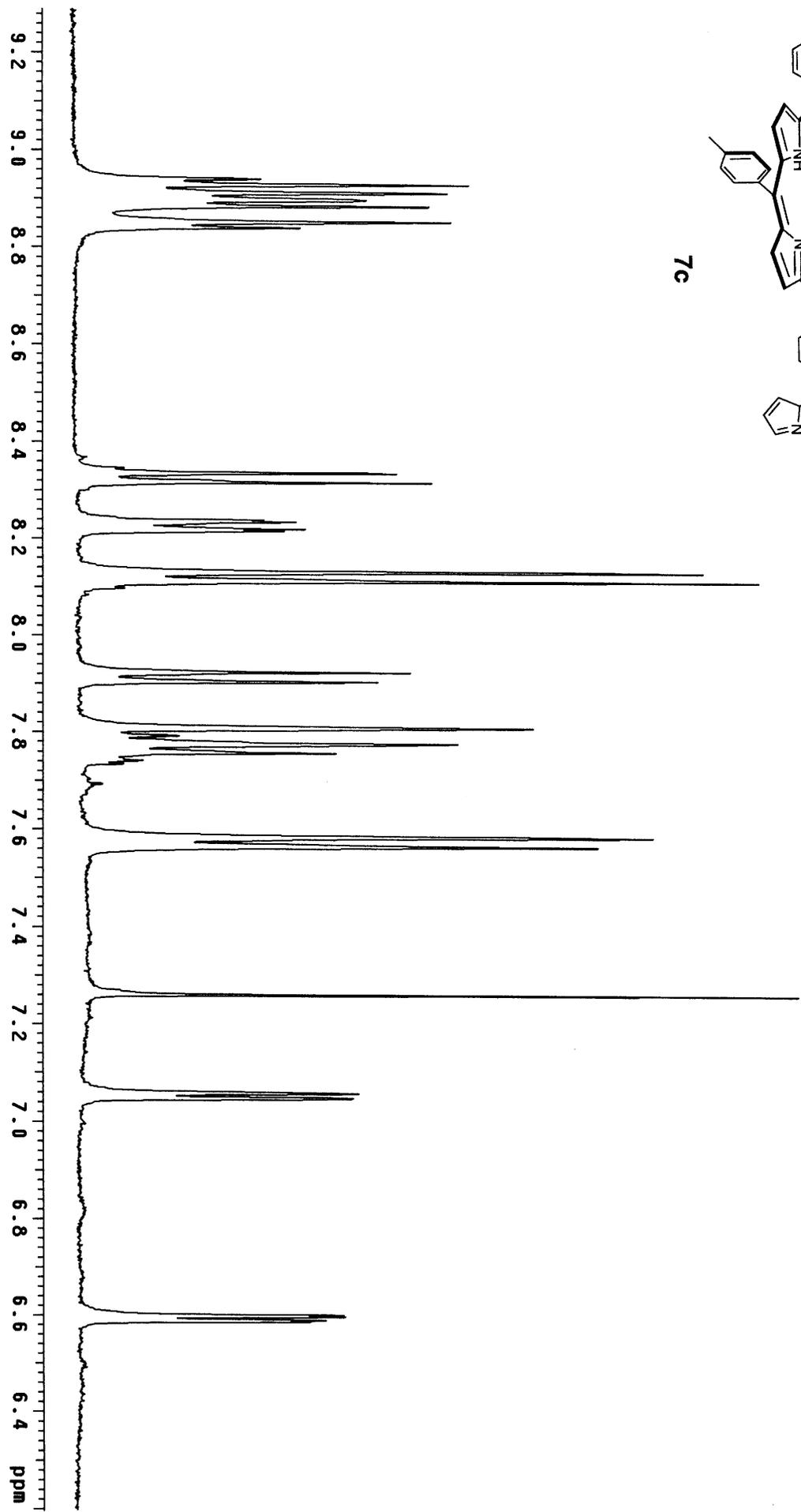
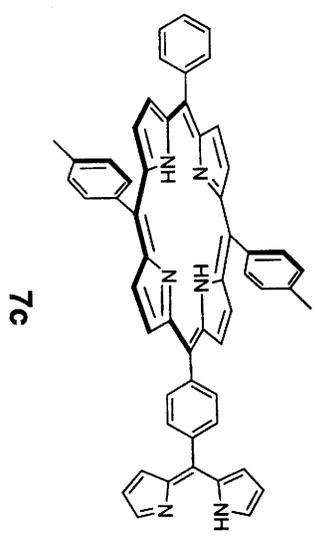


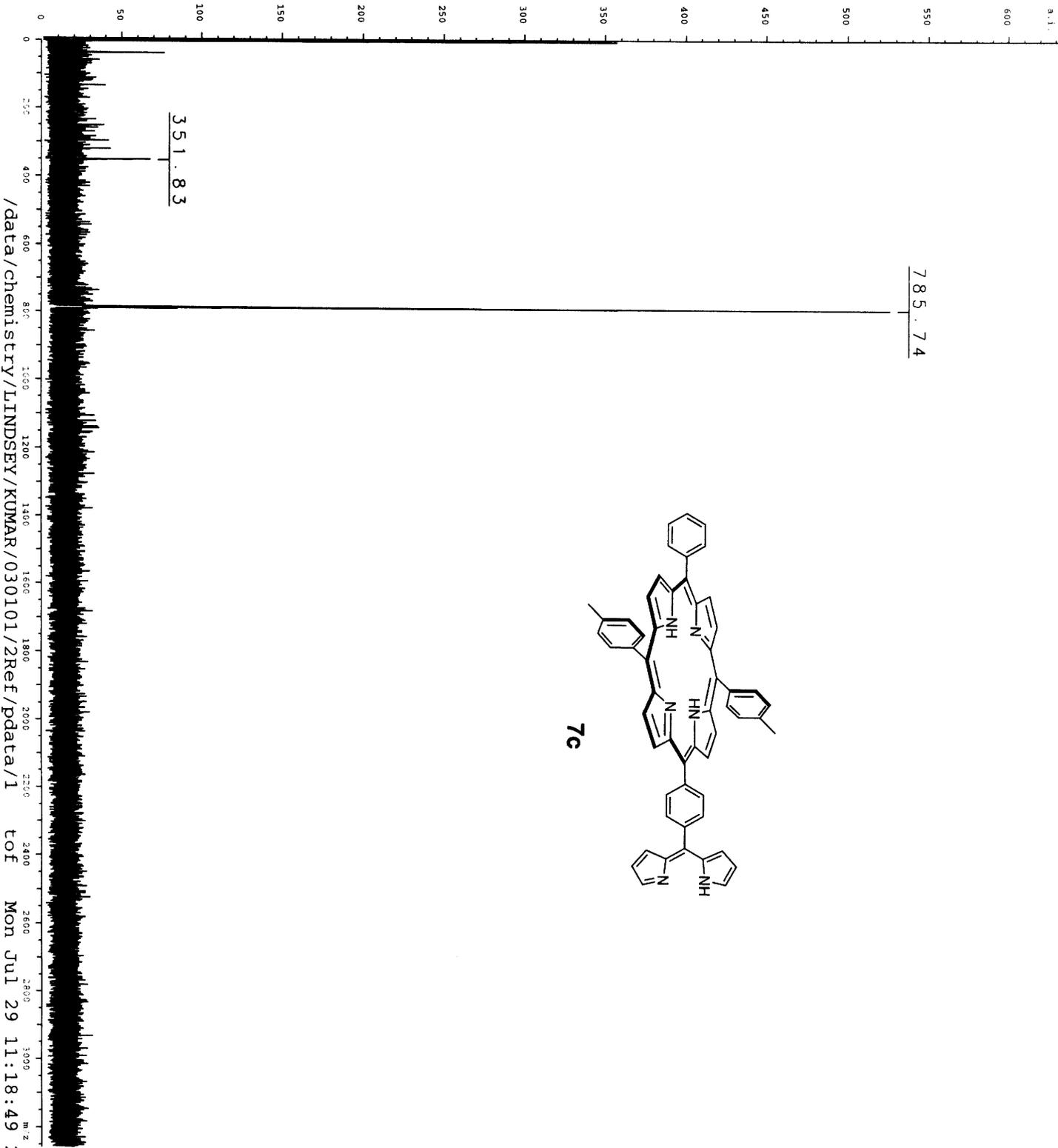


```

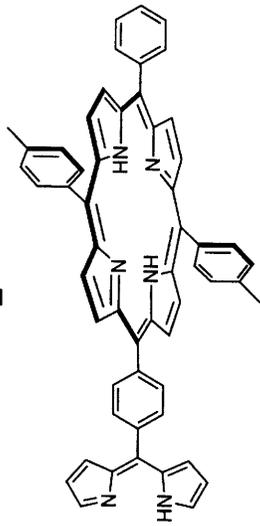
INSTRUM TOP
OPID N Sriharyasan
SERIAL 020201
AQ DATE Sat Mar 9 15:29:15 2002
PATH /data/chemistry/LINDSEY/LIANHE
POLARI POS
APQ2_m Reflector
AD 4000
MAGNIFY 0
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
DM 1.00 (ns)
DELAY 0 (ns)
U1a2 18.70 (KV)
U1a2 18.70 (KV)
U1a2 7.50 (KV)
U1a2s 10.00 (KV)
U1a2s 10.00 (KV)
U1a2s 1.50 (KV)
U1a2s 2.00 (KV)
U1a2s 1.00 (KV)
REPRZ 34.0
ATTEN 1.00 (Hz)
ML1 2067125.193
ML2 333.982
ML3 0.000
FILTER no
GDDLY Abort
DEFLON no
FILSEND no
LANSND no
DISZND no
DPCAL 510.84 (Da)
RMSZ 700.00 (Da)
RMSZ 0.28
RMSZ 0.91
ISZBND
CMT1 Ms-2-t-Bu-Ph-Dp, pure
CMT2 AtLen=16, shots = 87
  
```





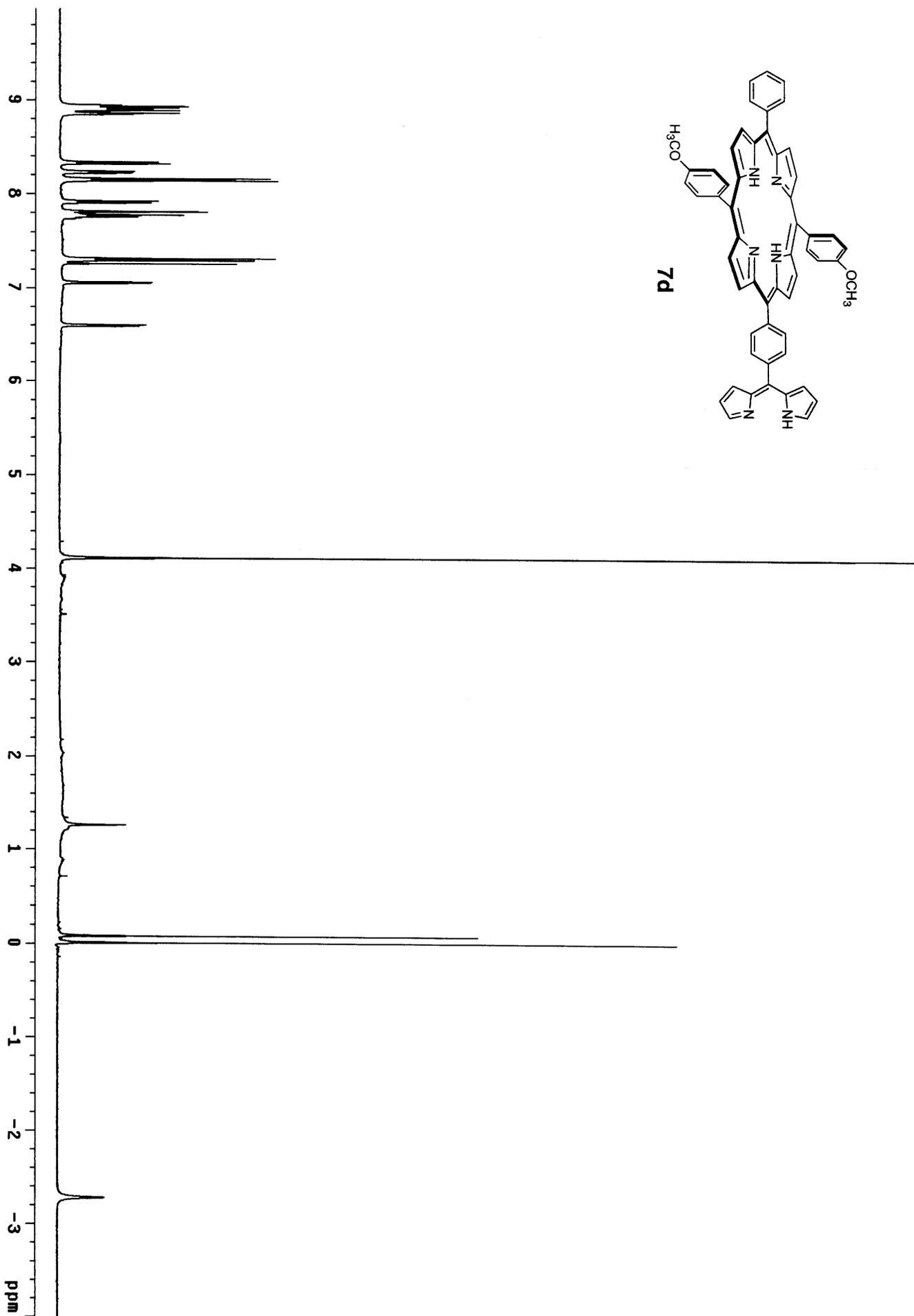
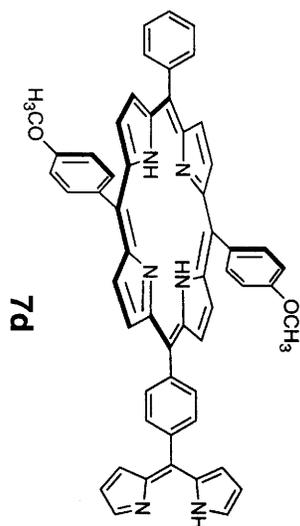


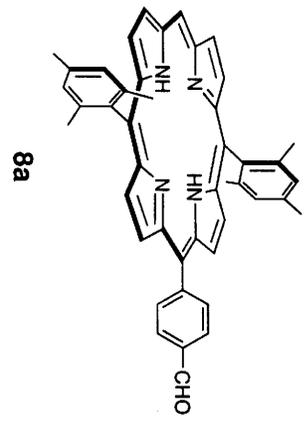
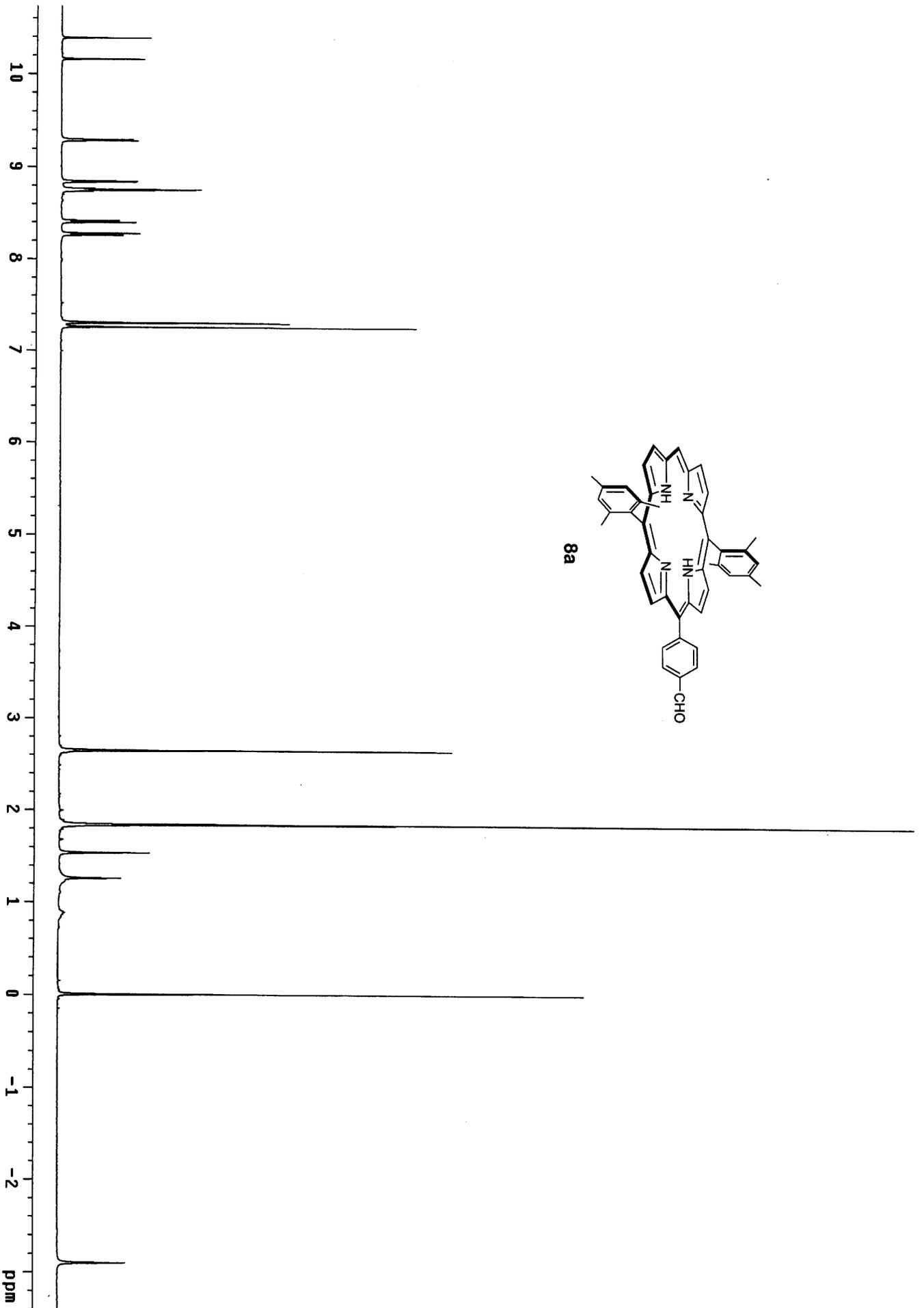
/data/chemistry/LINDSEY/KUMAR/030101/2Ref/pdata/1 tof Mon Jul 29 11:18:49 2002

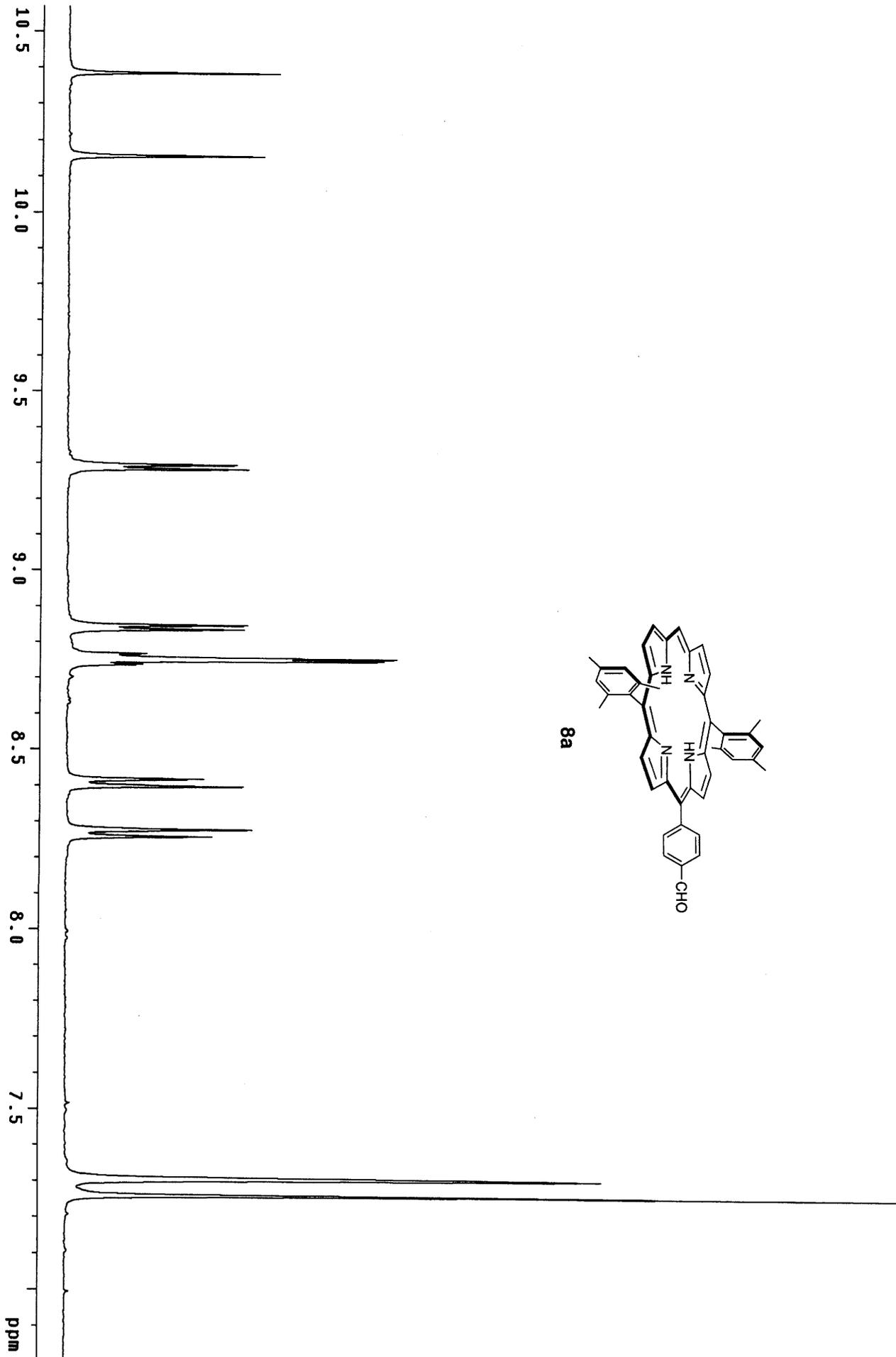
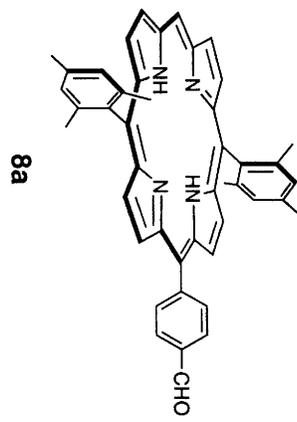


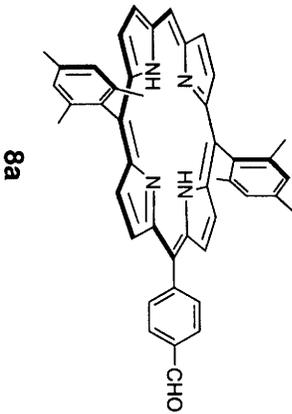
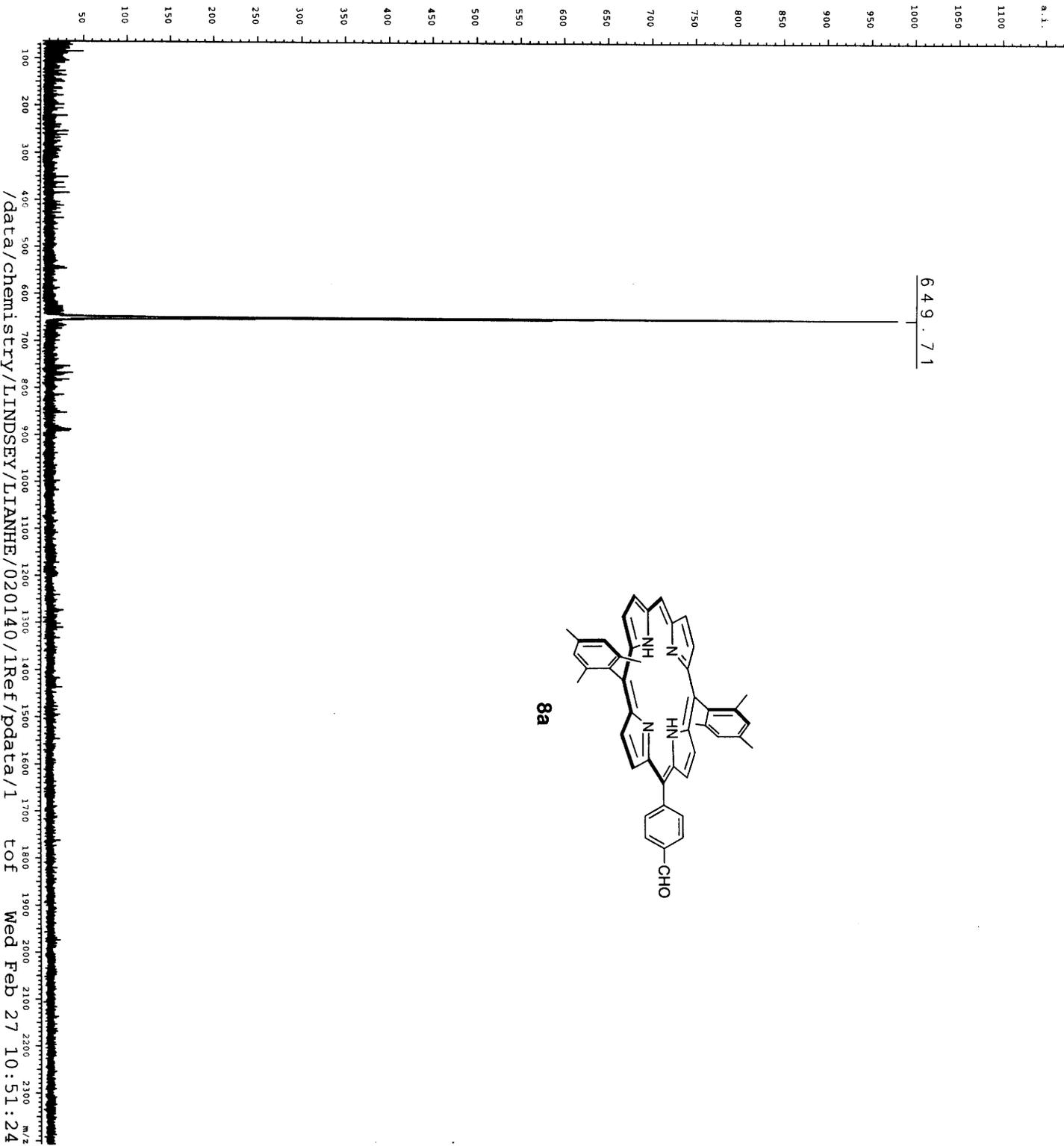
```

INSTRUM TOP
OpId N_Srinivasan
SPPNAM 030101
Ac DATE Mon Jul 29 11:11:04 2002
Path /data/chemistry/LINDSEY/KUMAR
Data /data/chemistry/LINDSEY/KUMAR
AcqP_m Reflector
TD 40000
NOSHOTS 50
SMONUM 0
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
DW 0
DELAY 1.00 [ns]
Uis1 0 [ns]
Uis2 20.00 [KV]
Uref1 18.70 [KV]
Uref2 9.00 [KV]
Uref3 9.00 [KV]
Uref4 10.00 [KV]
Uref5 0.00 [KV]
RefPUL1 1.50 [KV]
UaeRf 0.00 [KV]
UaeRf1 2.00 [KV]
REPRF 1.00 [Hz]
ATTEN 2.00
ML1 2071629.944
ML2 333.982
ML3 0.000
HITURBO no
GDECON yes
GDEPLY short
DEPRON no
DEPRND no
LANSRD no
UIS2BND no
DPCALI 510.84
DRYMASS 700.00 [Da]
RENDVAL 0.13
RENDV1 0.28
RENDV2 0.28
CMT1 kmk-119 7/29/02
CMT2 att 28
  
```



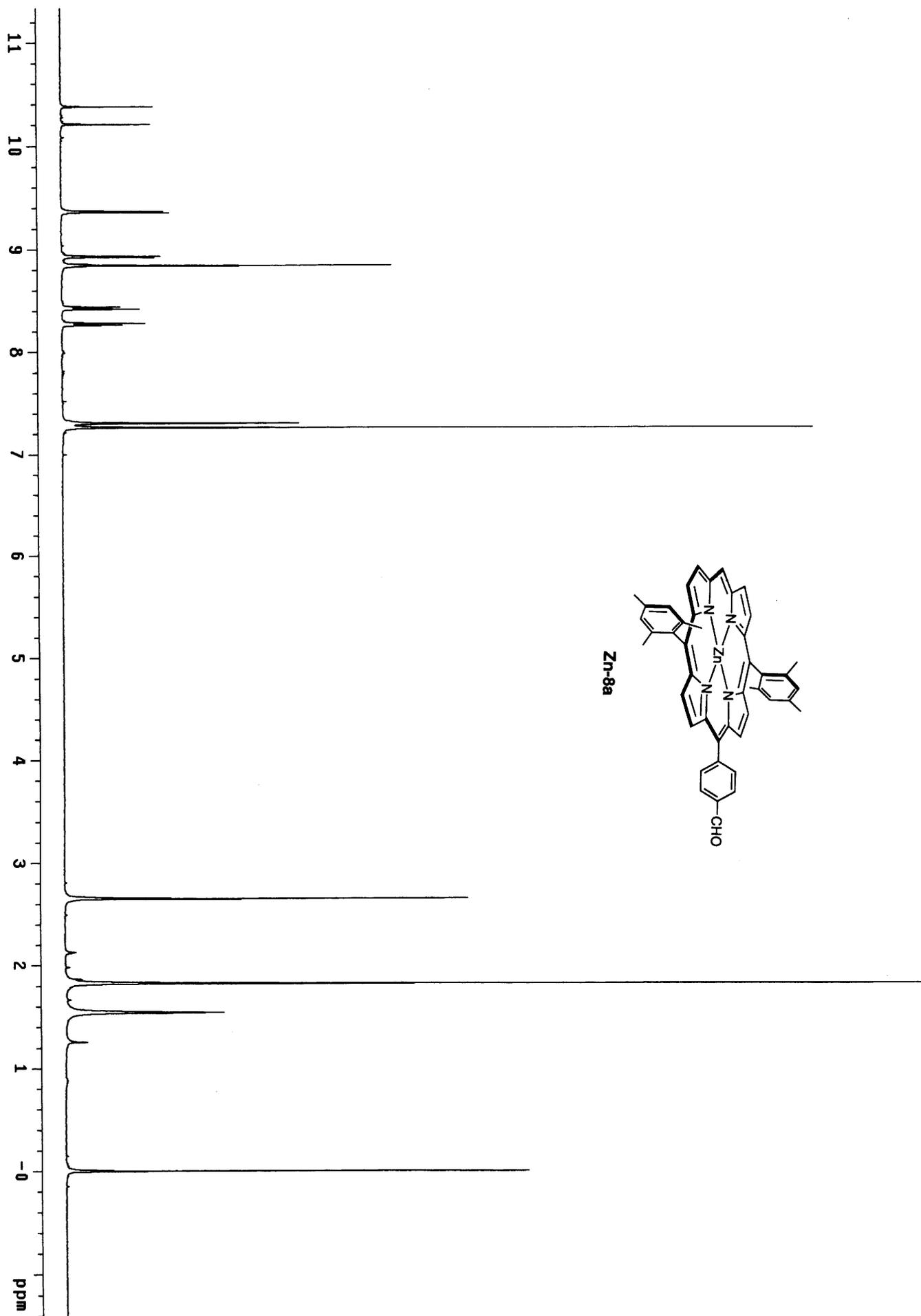


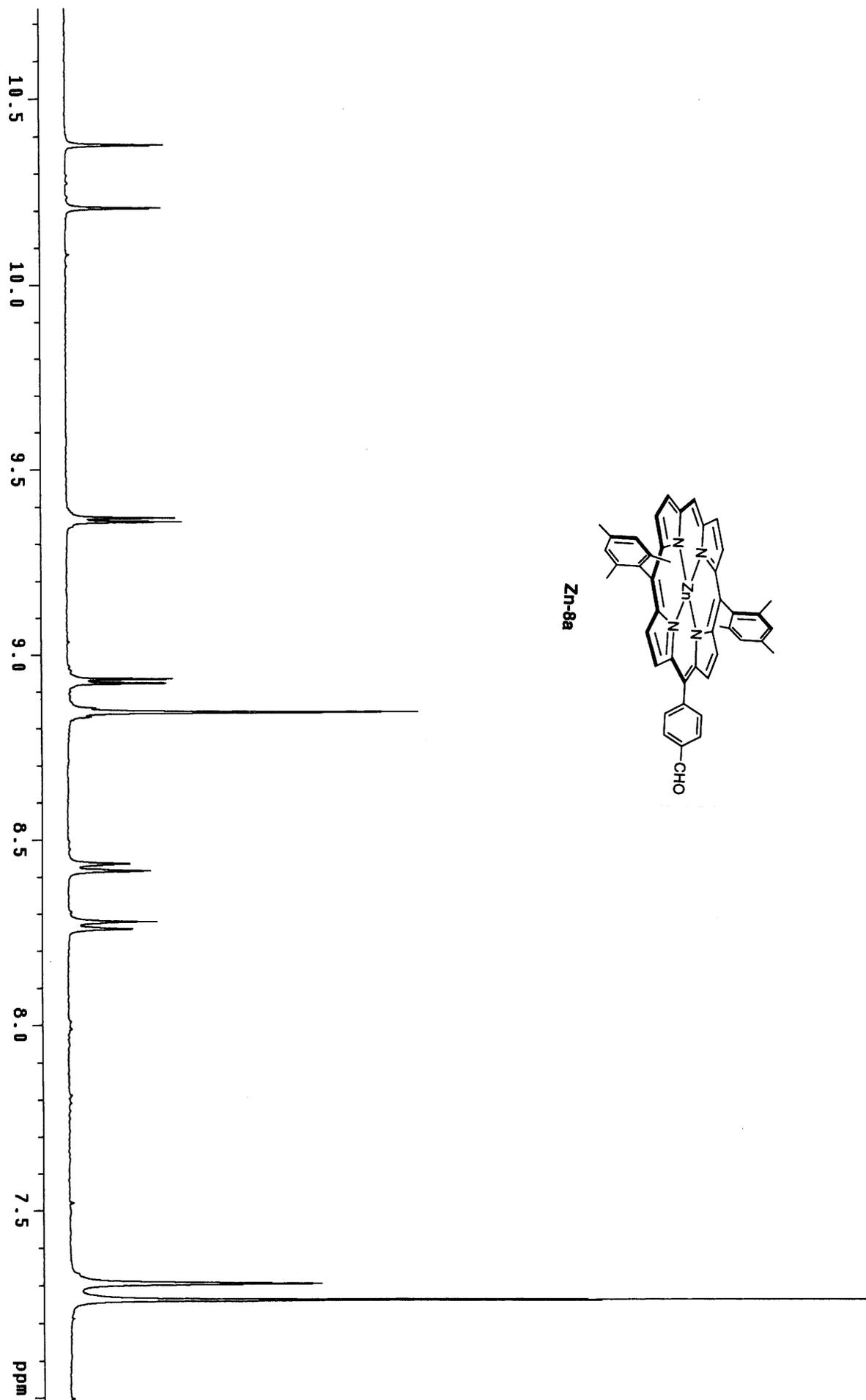
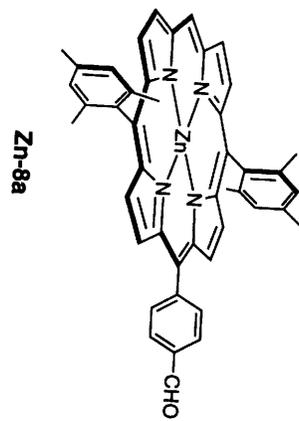




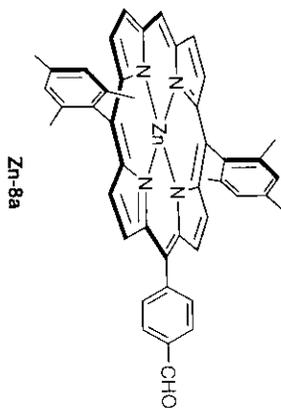
```

INSTRUM TOP
OPID      N. Srinivasan
SMPNAM    020140
AQ DATE   Wed Feb 27 10:44:00 2002
PRTR      /data/chemistry/LINDSEY/LIANHE
S2PRTR    /data/chemistry/LINDSEY/LIANHE
S2PRTR2   /data/chemistry/LINDSEY/LIANHE
ACQD_Lin  Reflector
TD         40000
NOSHOTS   51
SMONUM    0
SMOPTS1   0
SMOPTS2   0
SMOPTS3   0
DELY      1.00 [ms]
U1s1      20.00 [KV]
U1s2      18.70 [KV]
U1e1      0.00 [KV]
U1e2      7.50 [KV]
U1e3      10.00 [KV]
U1e4      10.00 [KV]
U1e5      1.50 [KV]
U1e6      0.00 [KV]
U1e7      2.00 [KV]
REPRZ     1.00 [Hz]
ATTEN     43.0
M1Z       2067125.193
M2        33.000
M3        0.000
HITURBO   no
GDECON    yes
GDEDELY   short
DEFLON    no
FLNSRND   no
UNSRND    no
DPRCALL   no
DPMASS     510.84 [Da]
RBNDDVAL  0.33
LBNDDVAL  0.28
ISZBNDVAL 0.91
CMT1      1H-2Ns-Benzene-CHO-Fb, pure
CMT2      atn=40, shot= 50
  
```



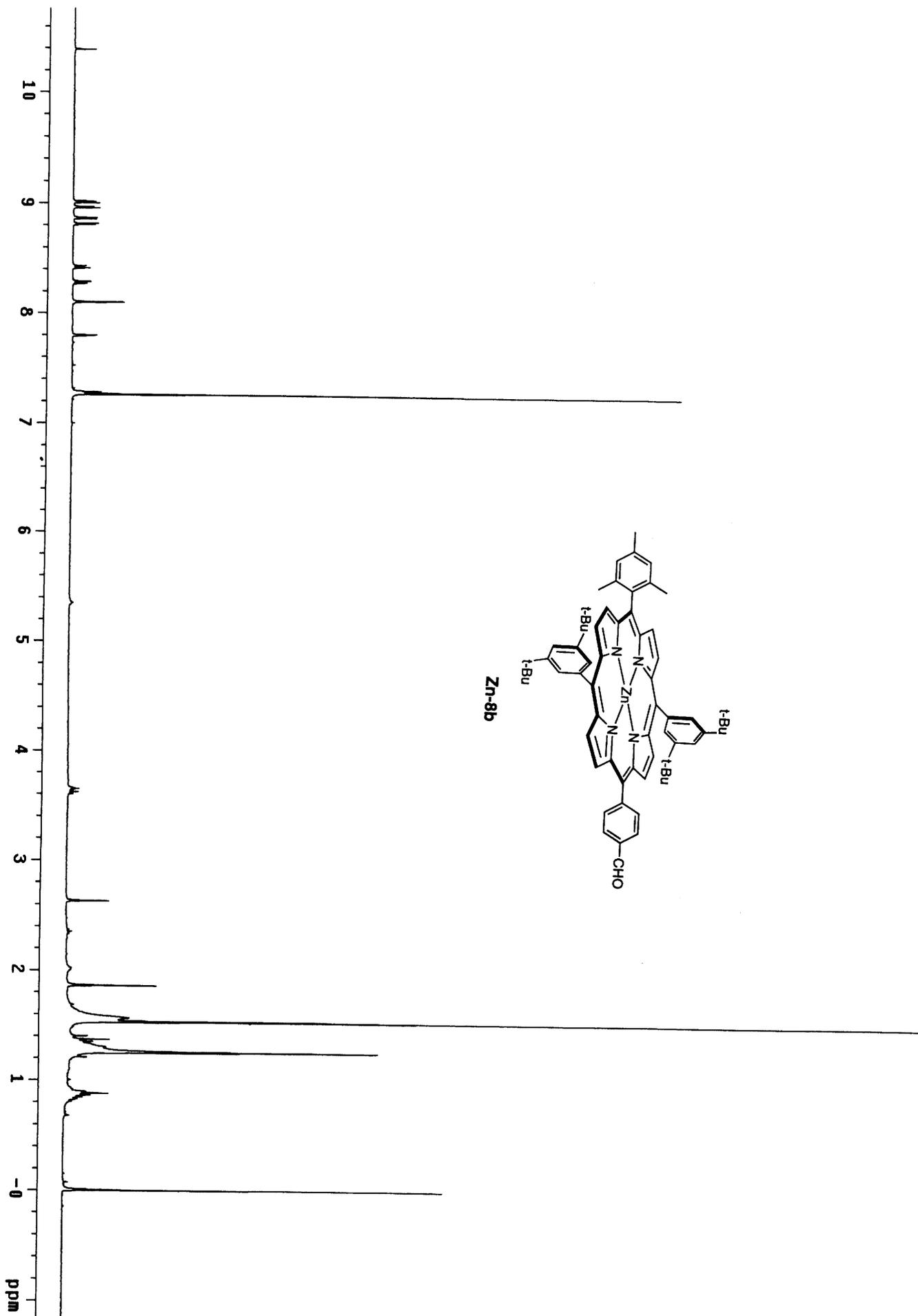


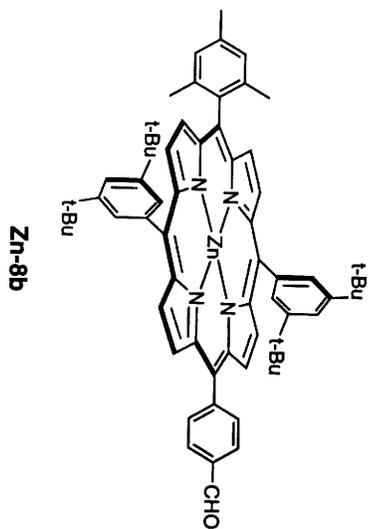
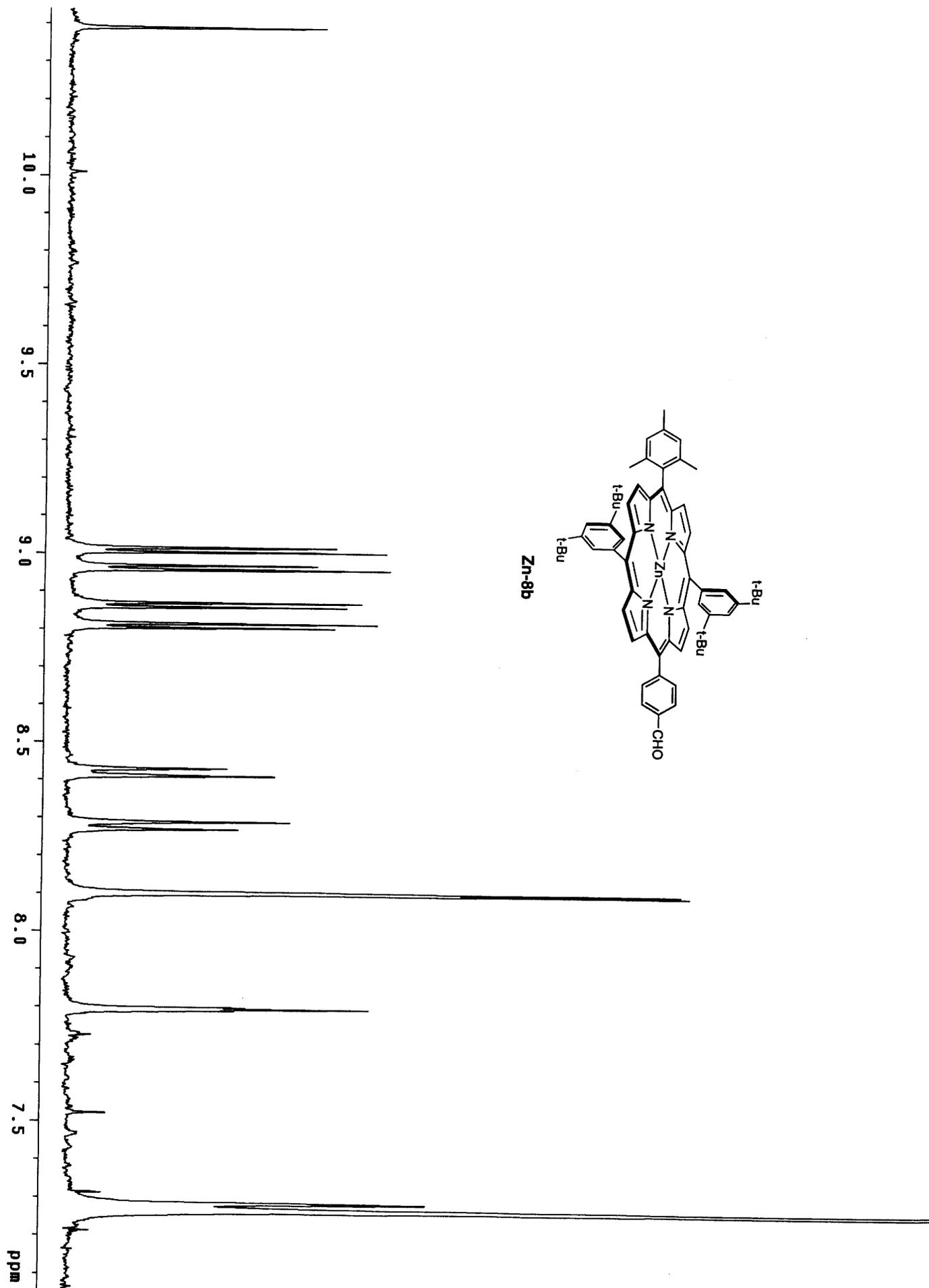
712.440



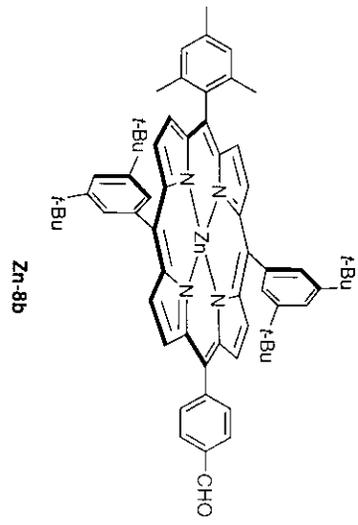
```

INSTNUM 757
ORIGIN 21/STANFORD
ANALYTE Zn-8a
DATA Zn-8a
POLAR PCS
ACQF 3 SelfRef
TO 10
RGMENTS
SKELETON
SMOPTS3
SMOPTS3
DR
DELAY 0.05 (NS)
UJ41 0.05 (KV)
UJ42 0.05 (KV)
UJ43 0.05 (KV)
UJ44 0.05 (KV)
UJ45 0.05 (KV)
UJ46 0.05 (KV)
UJ47 0.05 (KV)
UJ48 0.05 (KV)
UJ49 0.05 (KV)
UJ50 0.05 (KV)
UJ51 0.05 (KV)
UJ52 0.05 (KV)
UJ53 0.05 (KV)
UJ54 0.05 (KV)
UJ55 0.05 (KV)
UJ56 0.05 (KV)
UJ57 0.05 (KV)
UJ58 0.05 (KV)
UJ59 0.05 (KV)
UJ60 0.05 (KV)
UJ61 0.05 (KV)
UJ62 0.05 (KV)
UJ63 0.05 (KV)
UJ64 0.05 (KV)
UJ65 0.05 (KV)
UJ66 0.05 (KV)
UJ67 0.05 (KV)
UJ68 0.05 (KV)
UJ69 0.05 (KV)
UJ70 0.05 (KV)
UJ71 0.05 (KV)
UJ72 0.05 (KV)
UJ73 0.05 (KV)
UJ74 0.05 (KV)
UJ75 0.05 (KV)
UJ76 0.05 (KV)
UJ77 0.05 (KV)
UJ78 0.05 (KV)
UJ79 0.05 (KV)
UJ80 0.05 (KV)
UJ81 0.05 (KV)
UJ82 0.05 (KV)
UJ83 0.05 (KV)
UJ84 0.05 (KV)
UJ85 0.05 (KV)
UJ86 0.05 (KV)
UJ87 0.05 (KV)
UJ88 0.05 (KV)
UJ89 0.05 (KV)
UJ90 0.05 (KV)
UJ91 0.05 (KV)
UJ92 0.05 (KV)
UJ93 0.05 (KV)
UJ94 0.05 (KV)
UJ95 0.05 (KV)
UJ96 0.05 (KV)
UJ97 0.05 (KV)
UJ98 0.05 (KV)
UJ99 0.05 (KV)
UJ100 0.05 (KV)
M1 2263721.154
M2 2263728
M3 0.504
HITREQ no
CDBIN yes
DECON report
ELSSND no
UJ2BND no
DPCAL1 320.84 (Da)
DPA355 0.05
FINDVAL 0.05
ISBNDV 0.05
OMT Zn-8a + SE 10
OMT2 no matrix
  
```



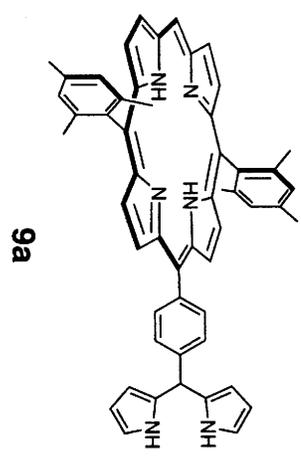
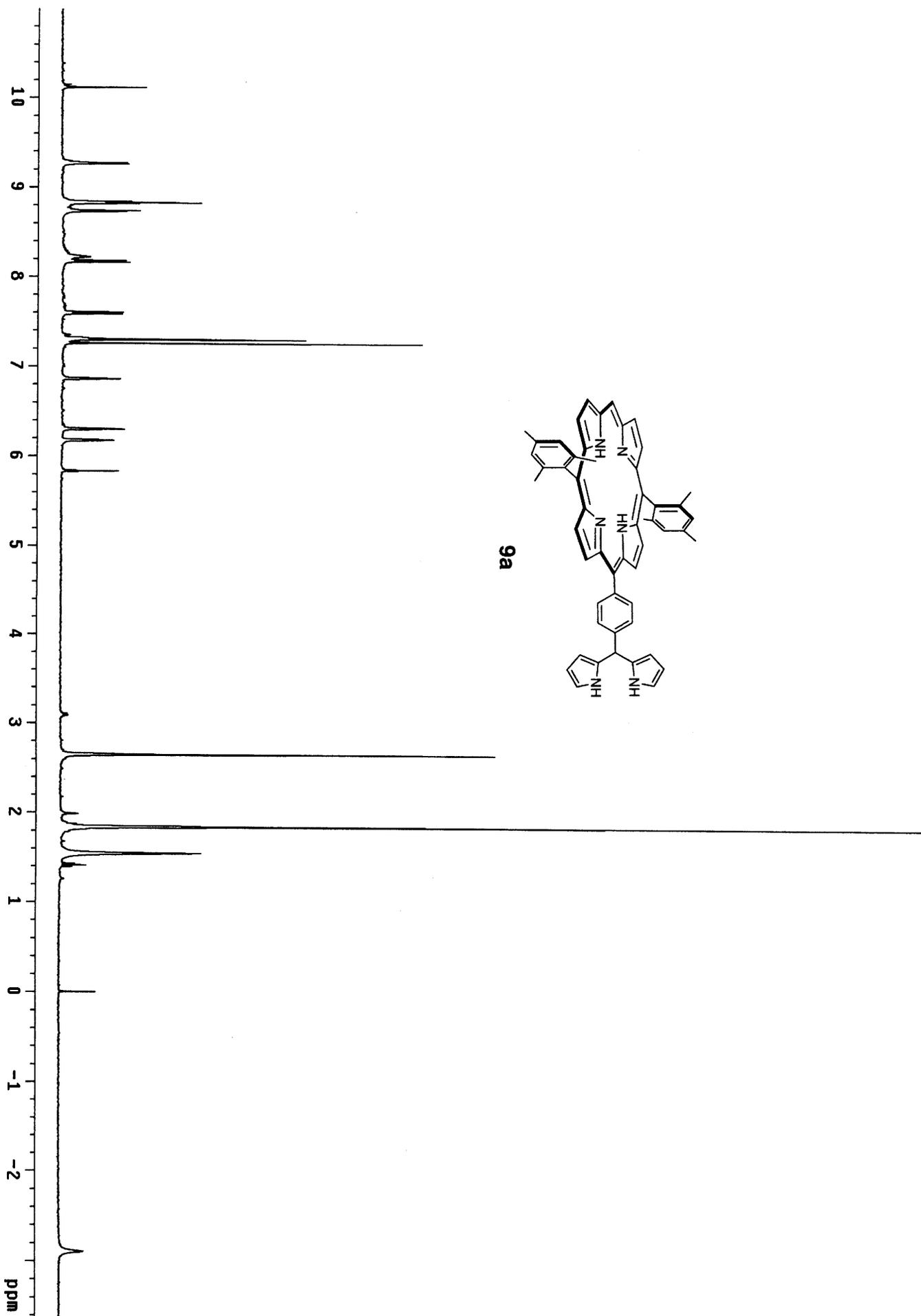


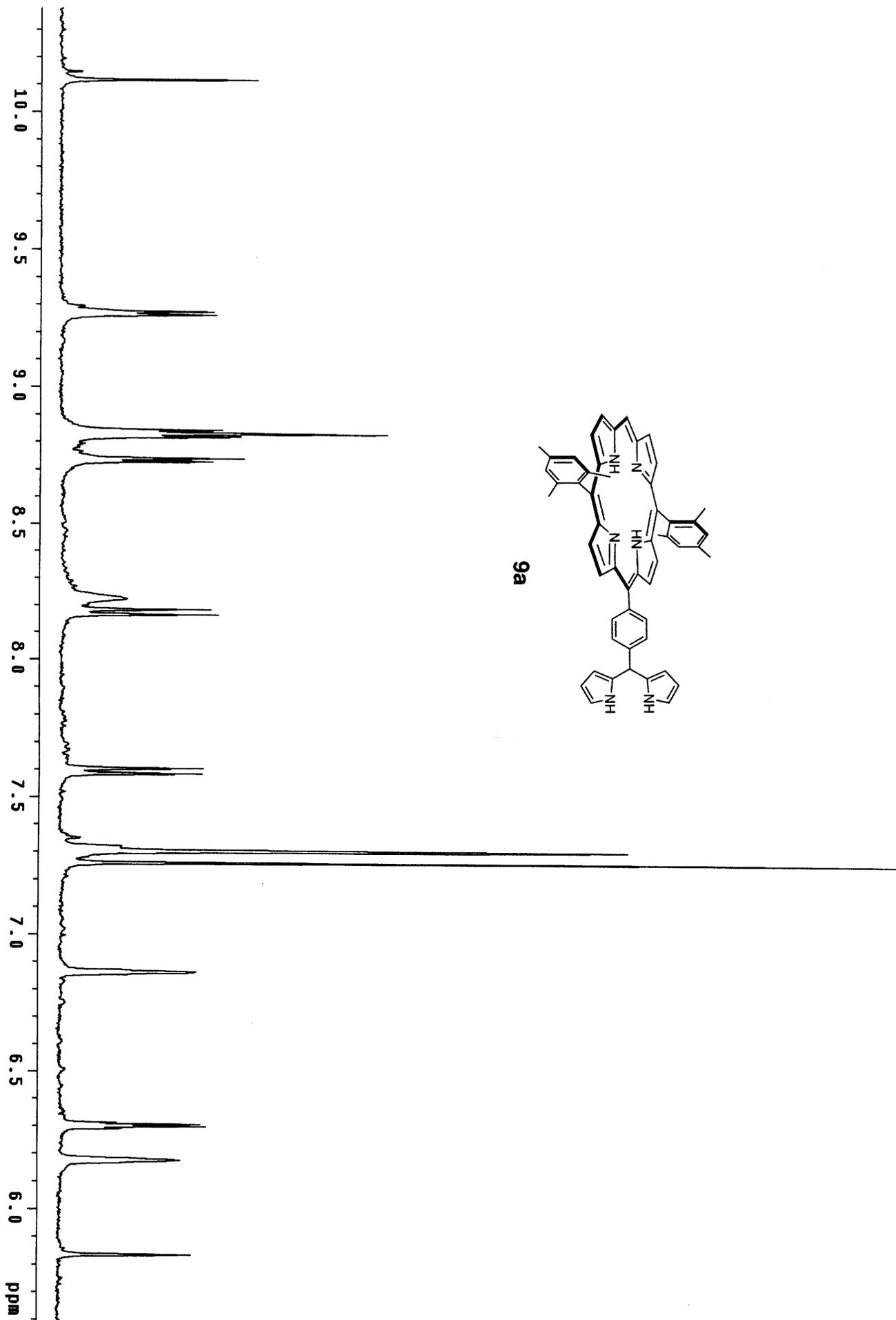
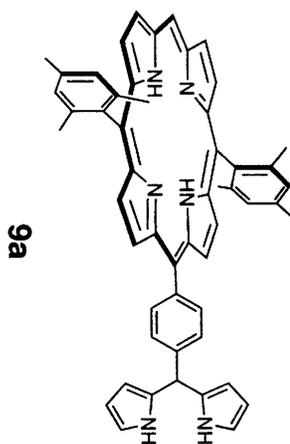
970.653

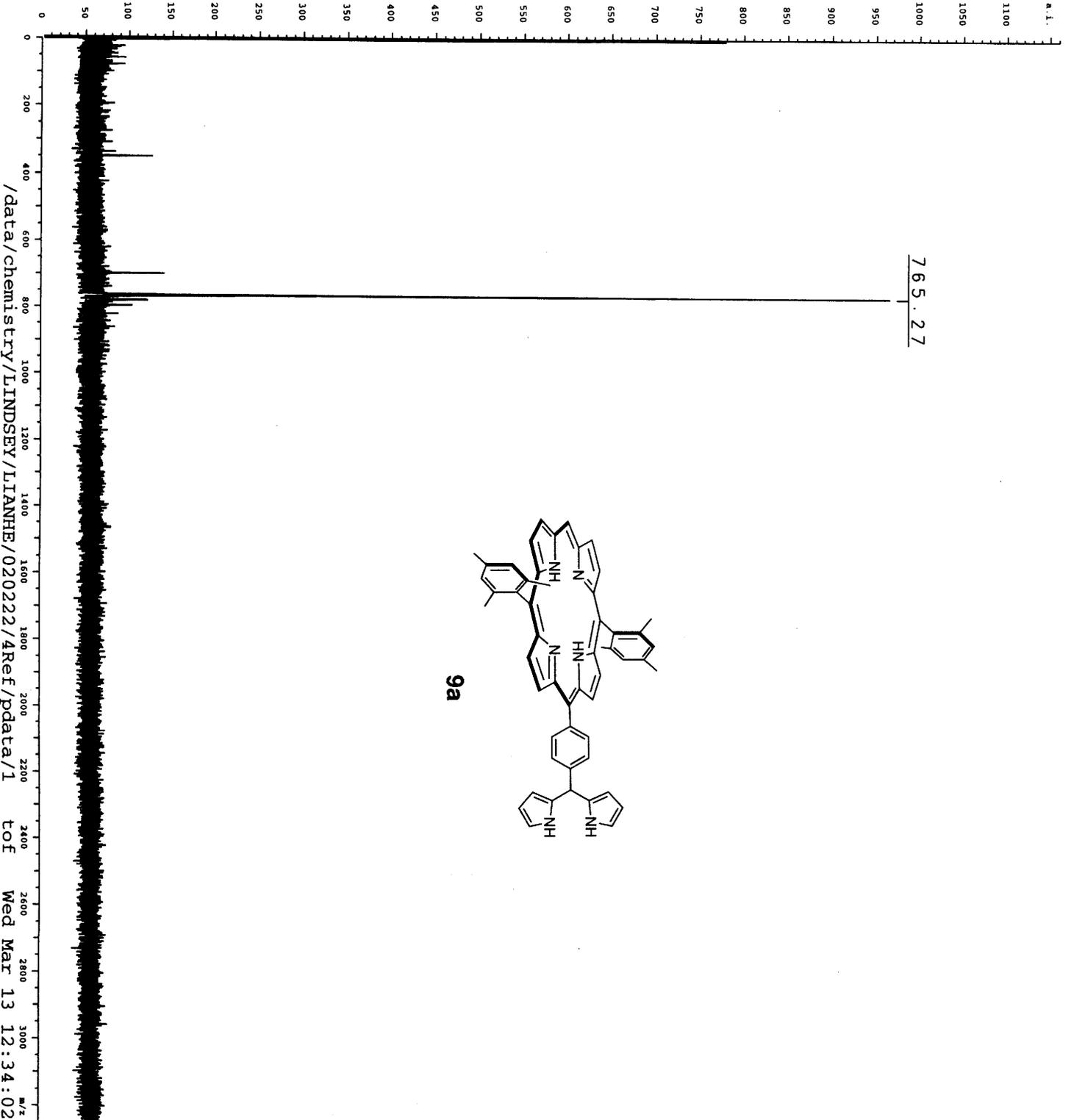


```

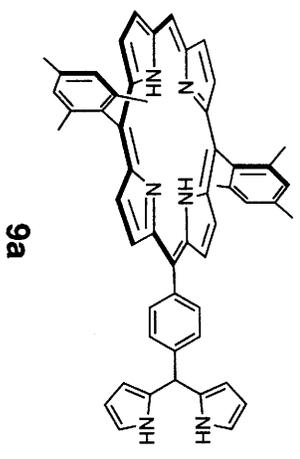
INSTRUM TOP
GENAM N: stinivasan
EXPNO 06/01/03
ACQDATE Tue Jul 1 10:24:46 2003
P1DIR /data/chemistry/LINDESEY/LANHE
POLABI POS
ACQPRG Refinement
INSTRUM
NAME
NOISES 65
SMOOTH 0
SMPRES 0
SMPRES2 0
SMPRES3 0
DELTA 1.05 [Hz]
S2F1 0 [ns]
S2F2 20.00 [K]
U2S21 18.00 [K]
U2S22 18.00 [K]
U2S23 7.50 [K]
U3S24 10.00 [K]
U3S25 10.00 [K]
U3S26 1.50 [K]
S2F3 0.00 [K]
S2F4 2.00 [K]
S2F5 3.00 [Hz]
M11 2063321.150
M12 326.709
M13 0.000
HITREQ no
SUBON Yes
DETCOR PROT
LINSRND no
LINSRND no
O1SRND no
O2CAL1 510.84
DPRESS 700.00 [Pa]
S2RVAL 0.23
S2RVAL2 0.91
S2RVAL3 0.91
CMT1 Zn-8b = SE 151
CMT2 NO MATRIX
  
```





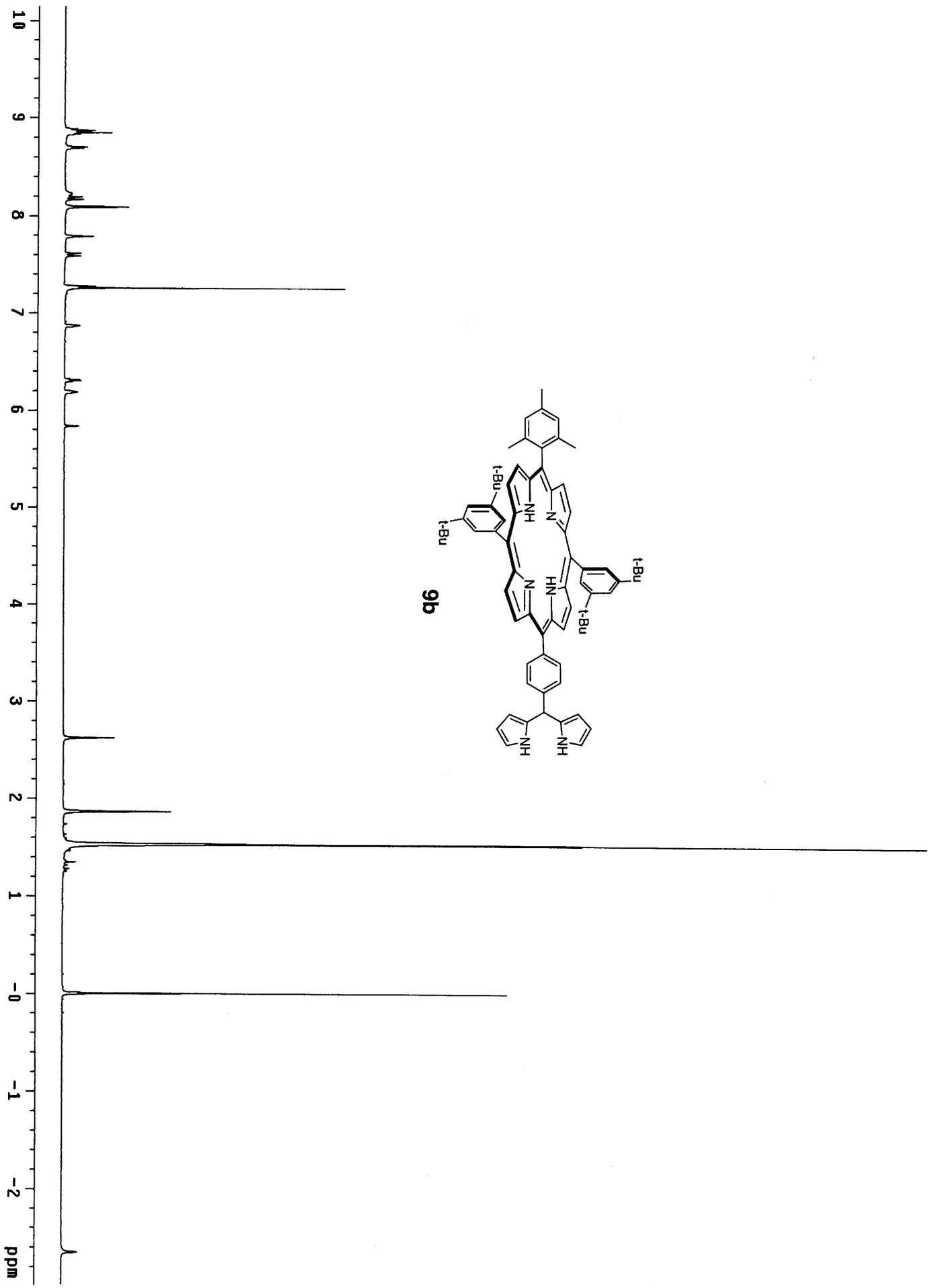


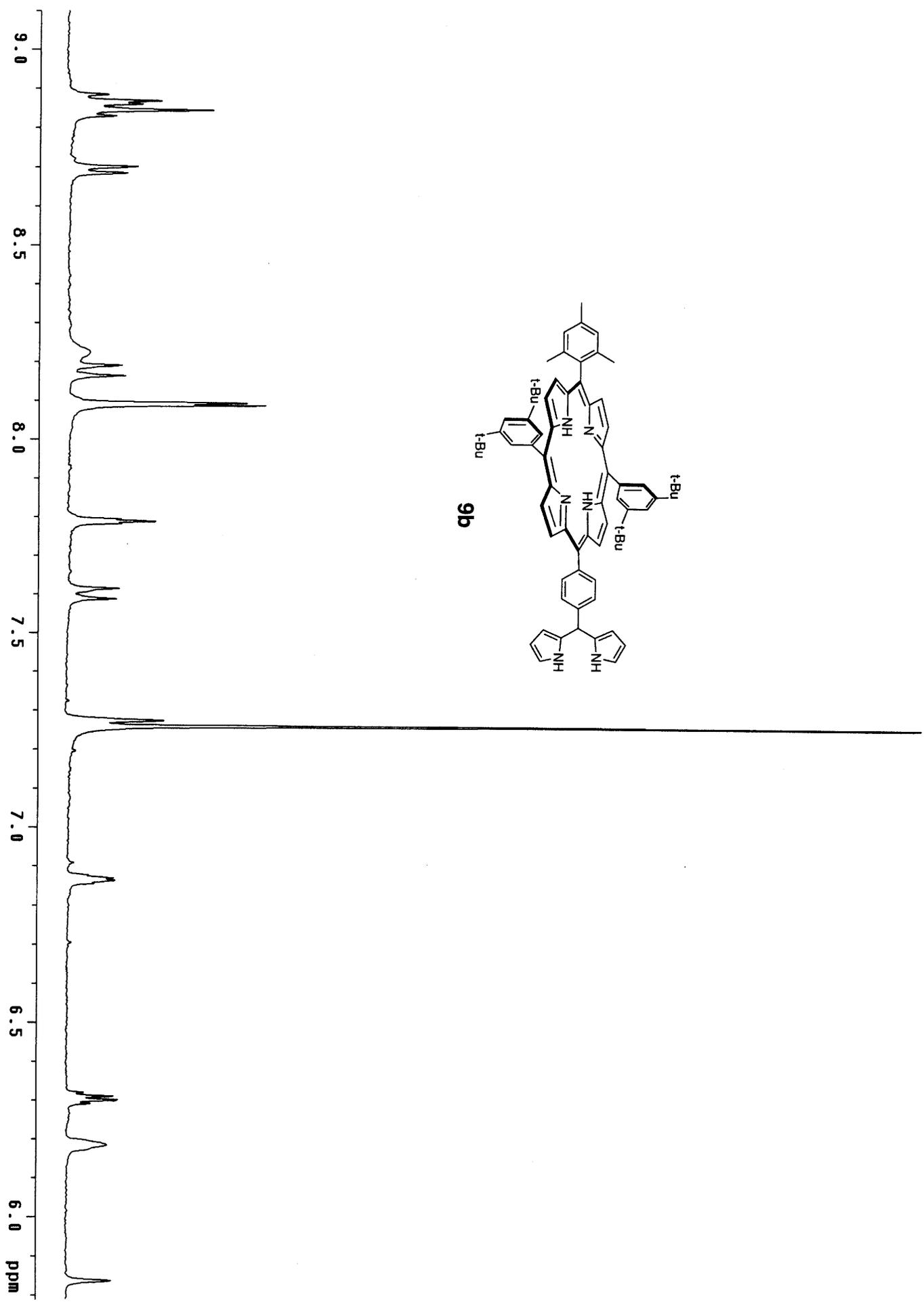
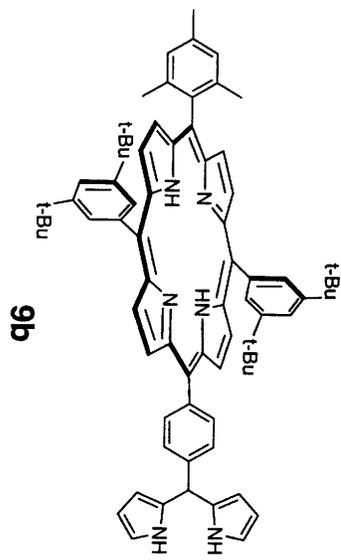
/data/chemistry/LINDESEY/LIANHE/020222/ARef/pdata/1 tof Wed Mar 13 12:34:02 2002

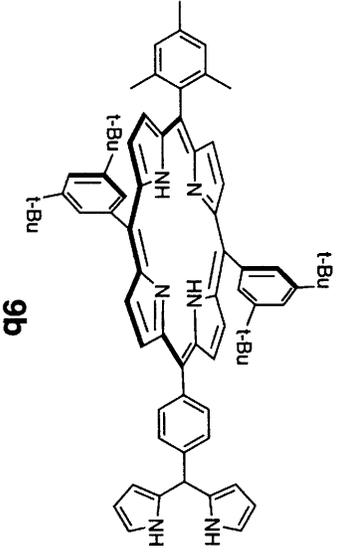
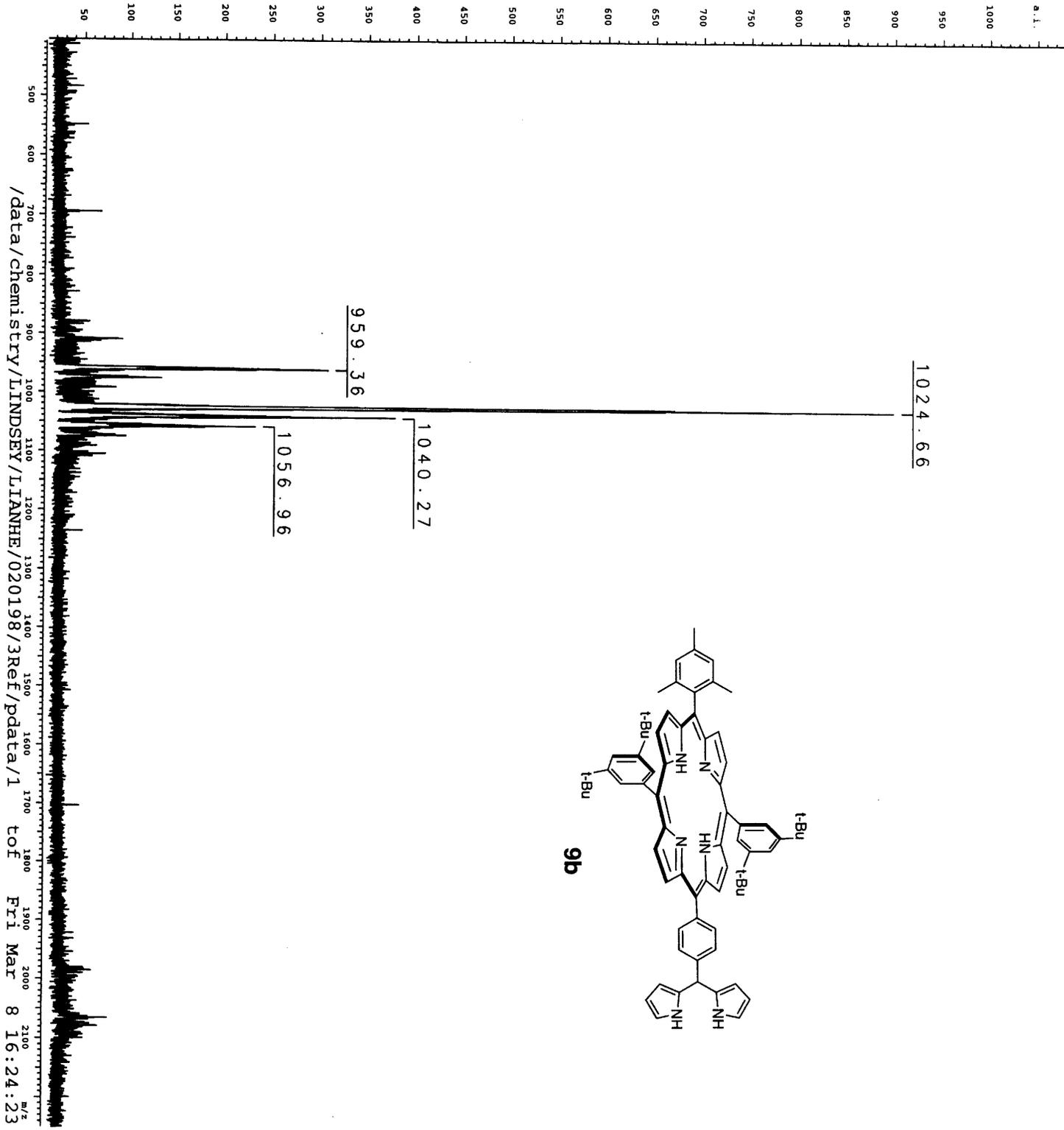


```

INSTRUM  TOF
OPID     N SriIvaasan
SUNAM    020222
AQ DATE  Wed Mar 13 12:33:28 2002
PATH     /data/chemistry/LINDESEY/LIANHE
POLARIT  POS
AQP Jm   Reflector
XD        4000
YD        100
XS        100
YS        0
SMOPTS1  0
SMOPTS2  0
SMOPTS3  0
DW        1.00 (ns)
DELAY    0 (ns)
U1a1     18.70 (KV)
U1a2     0.00 (KV)
U1a3     7.50 (KV)
U1a4     10.00 (KV)
U1a5     0.00 (KV)
U1a6     1.50 (KV)
U1a7     2.00 (KV)
U1a8     1.00 (KV)
REPRIZ   1.00 (Hz)
ATTEN    40.0
M1.1     2067125.193
M1.2     333.982
M1.3     0.000
HITURBO  no
G123456  no
G123457  no
G123458  no
G123459  no
G123460  no
DIRSCAN  no
R123456  no
R123457  no
R123458  no
R123459  no
R123460  no
U123456  no
U123457  no
U123458  no
U123459  no
U123460  no
DPCAL1   510.84
DPCAL2   700.39 (Da)
DPCAL3   0.28
DPCAL4   0.91
IS28RDV  1R-2Ms-Pt-DPr-Pb, pure
CMT1     Attrs= 40 shots = 100
CMT2
  
```

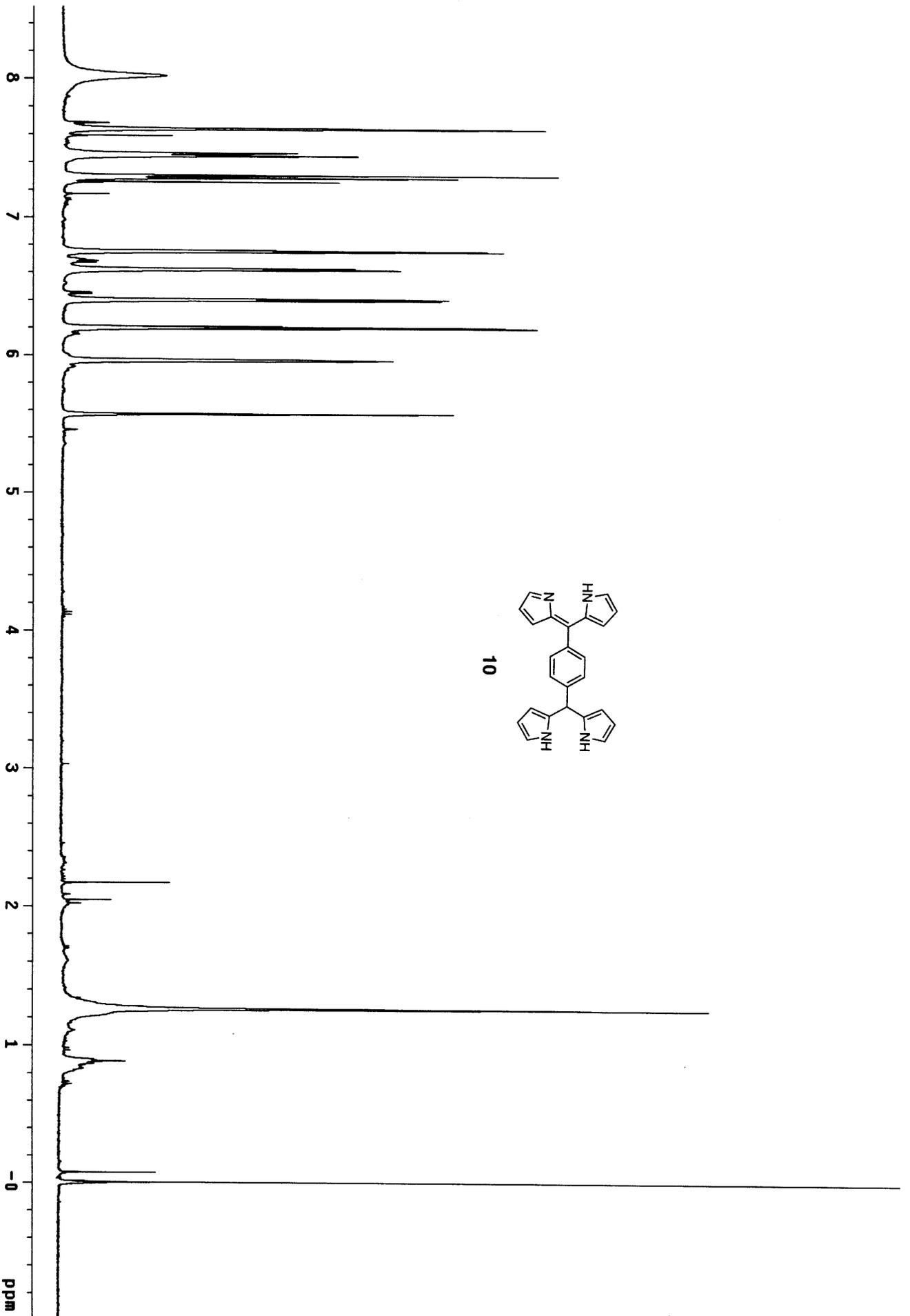


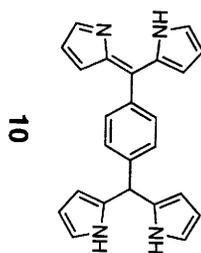




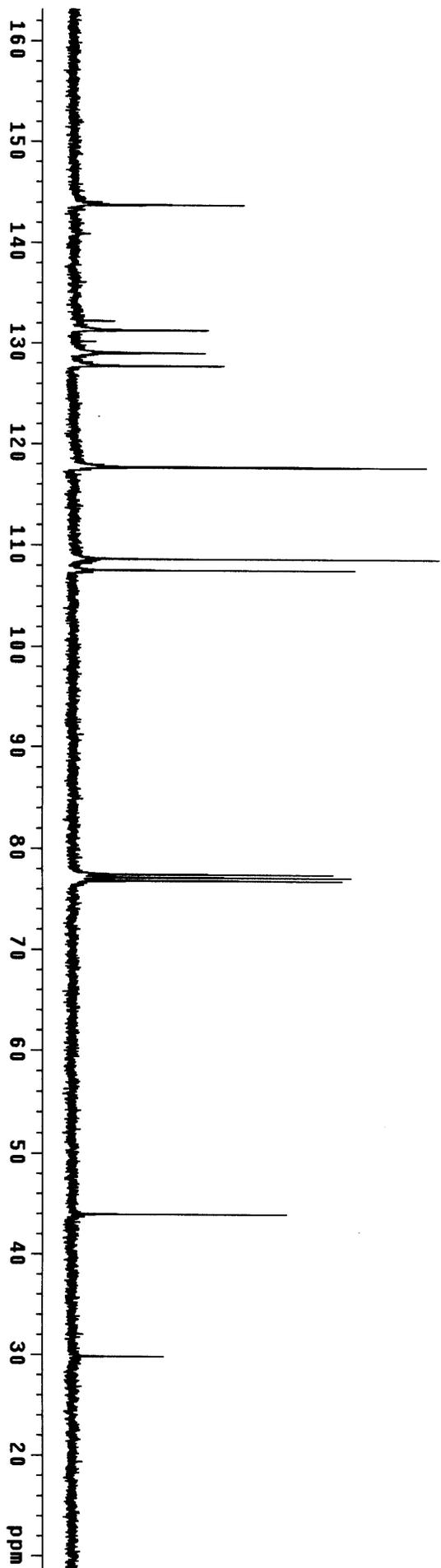
```

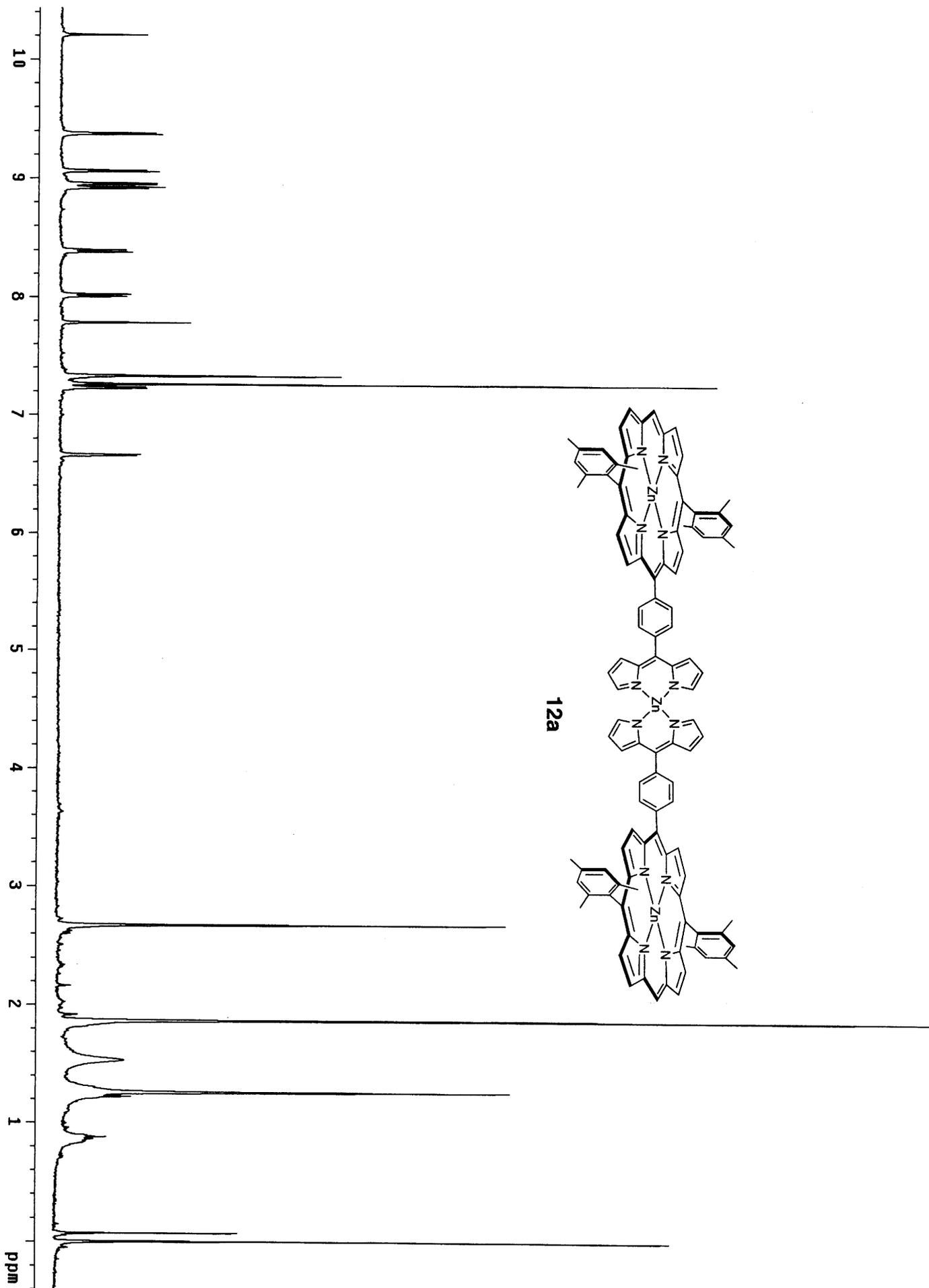
INSTRUM TOP
OPID N. Srinivasan
SERVNUM 020198
ACQ DATE Fri Mar 8 16:15:57 2002
PC PATH /data/chemistry/LINDSEY/LIANHE
PORTARI 300
AOPD_m Reflector
TD 40000
NOSSHOTS 39
SMONUM 0
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
DM 0
DELAY 1.00 [ns]
U1a1 20.00 [kV]
U1a2 18.70 [kV]
U1e1 0.00 [kV]
U1e2 7.50 [kV]
U1e3 10.00 [kV]
P1a1 1.00 [kV]
P1e1 1.50 [kV]
Udacr 0.00 [kV]
Udacr1 2.00 [kV]
RPPHZ 1.00 [Hz]
AVTEN 35.0
M1 2067125.193
M2 333.982
M3 0.000
HITURBO no
GDEON yes
GDELY short
DEFLON no
FLASND no
FLASND1 no
DIRCL no
DPMAS 510.84 [Da]
REMOVAL 700.00 [Da]
LBRNDVAL 0.33
ISZBRDV 0.28
CMT1 Ms-2-t-Bu-Pt-Dfm. Pure
CMT2 Atcm=35, shots = 40
  
```

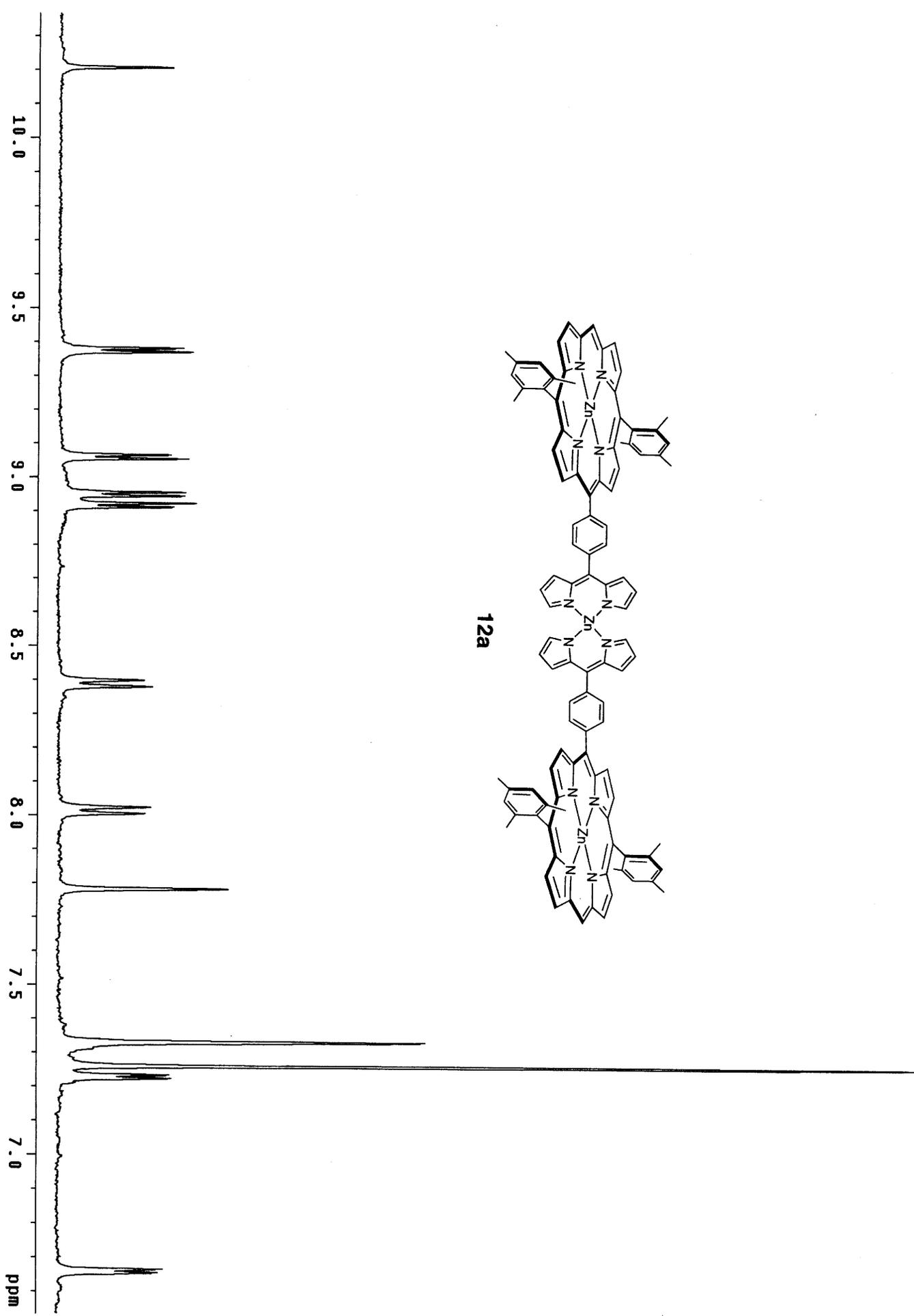
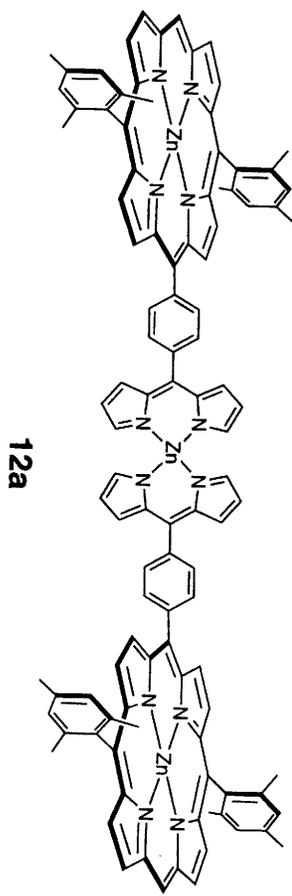


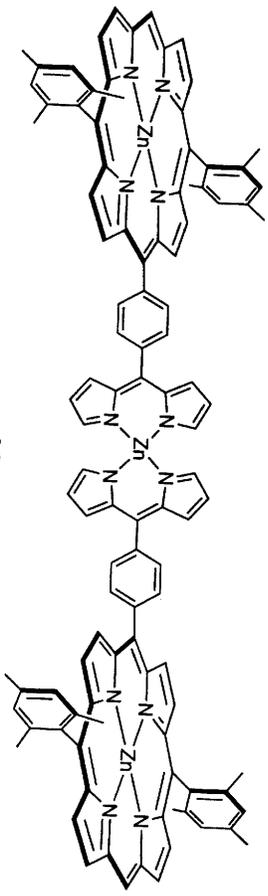
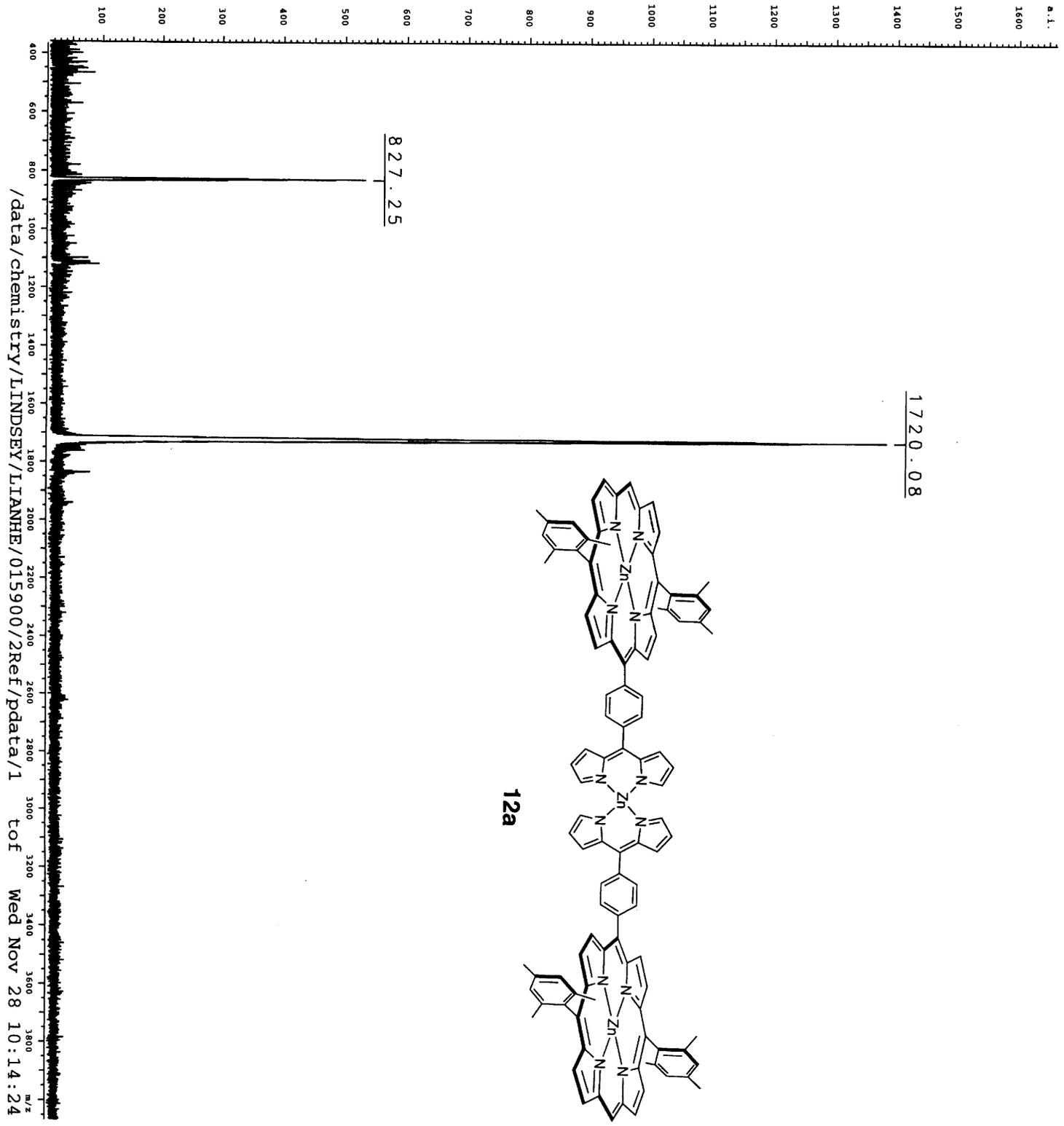


10



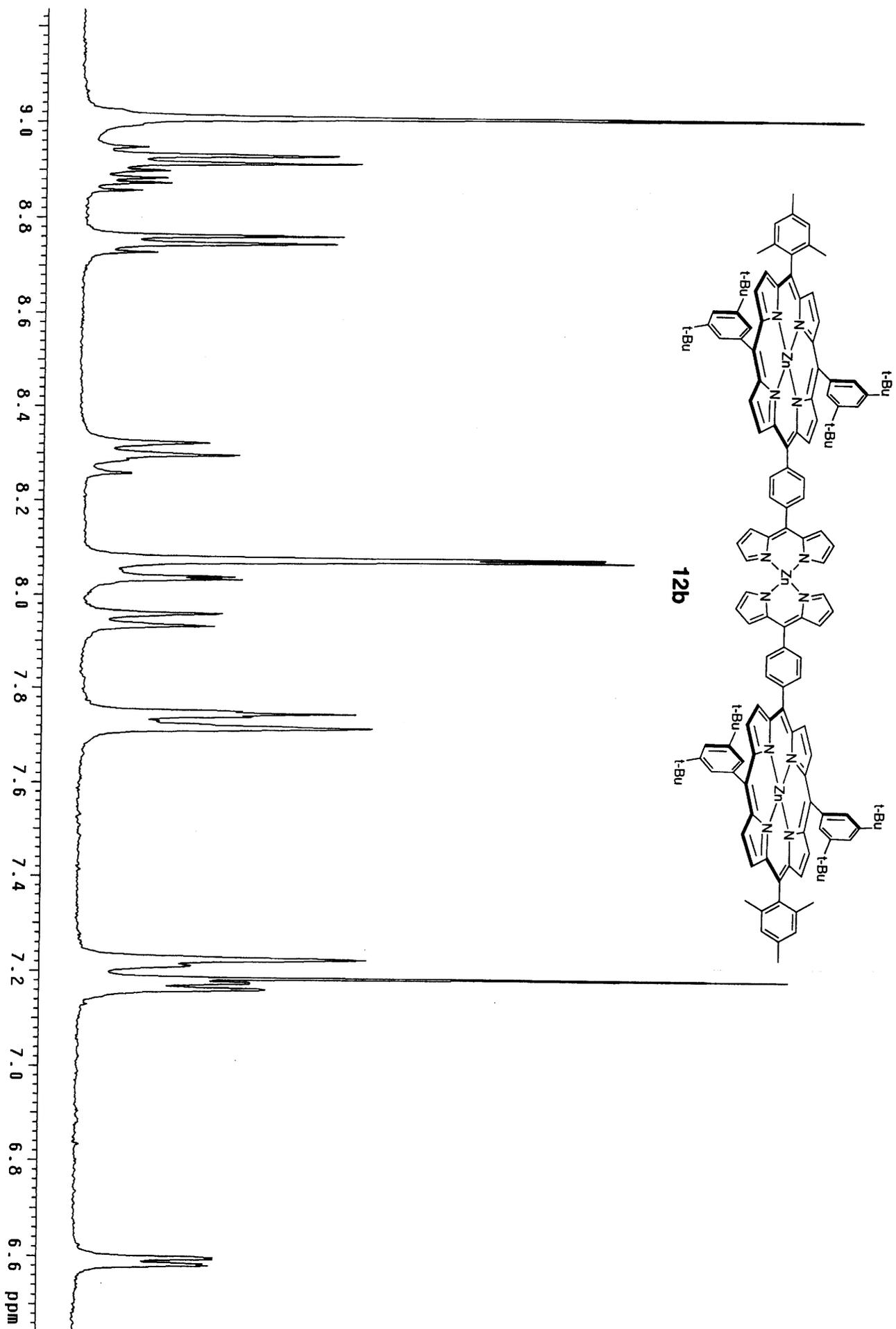


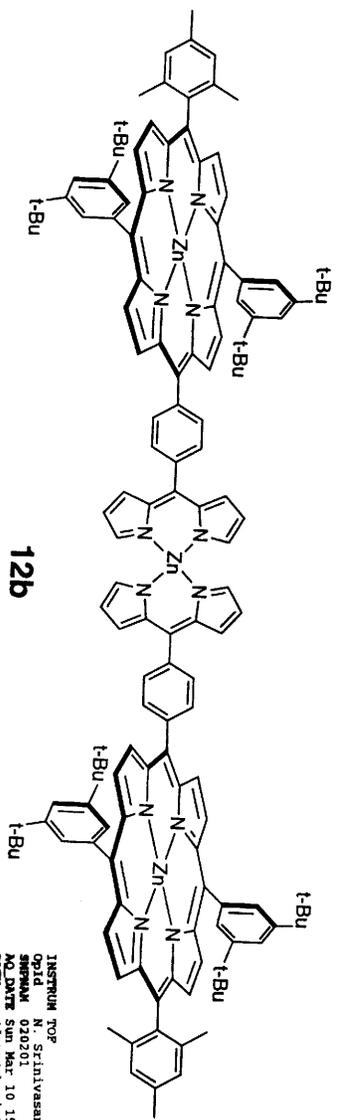
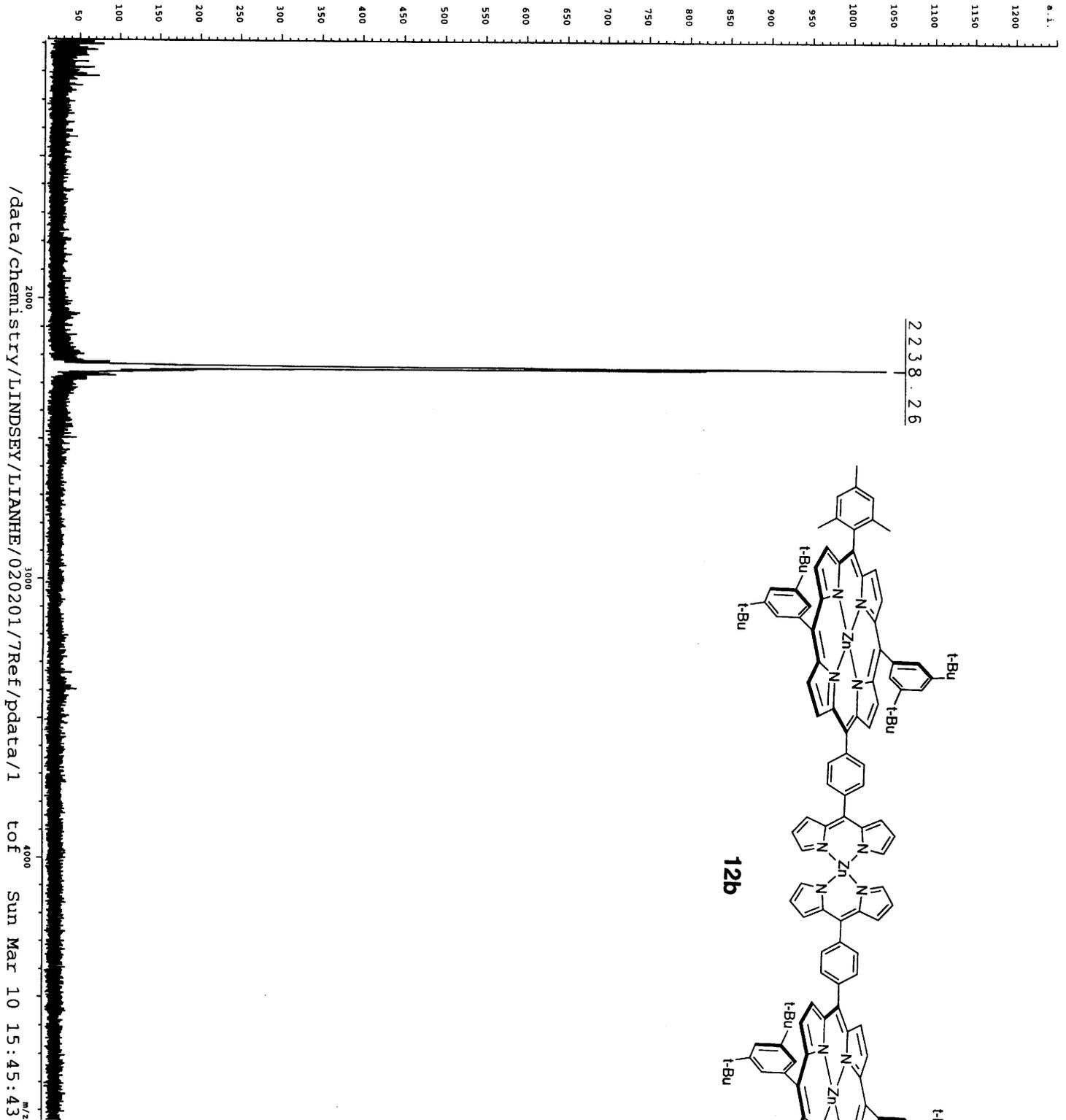




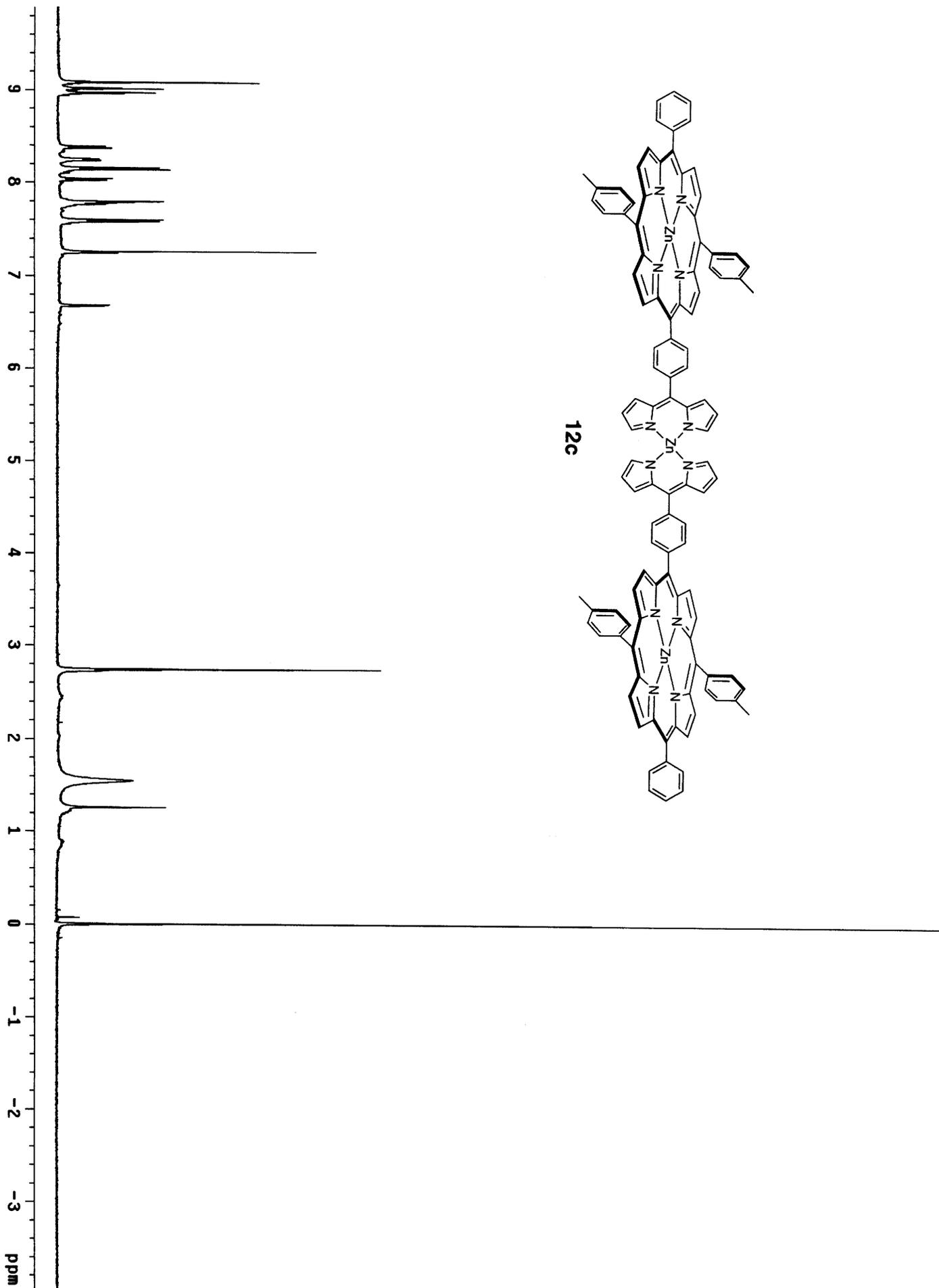
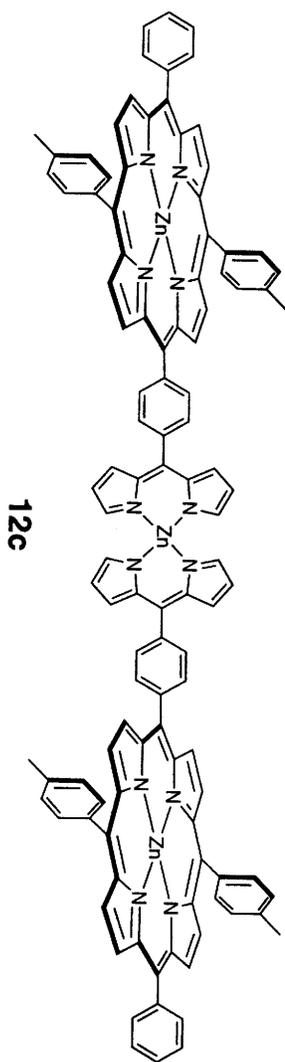
```

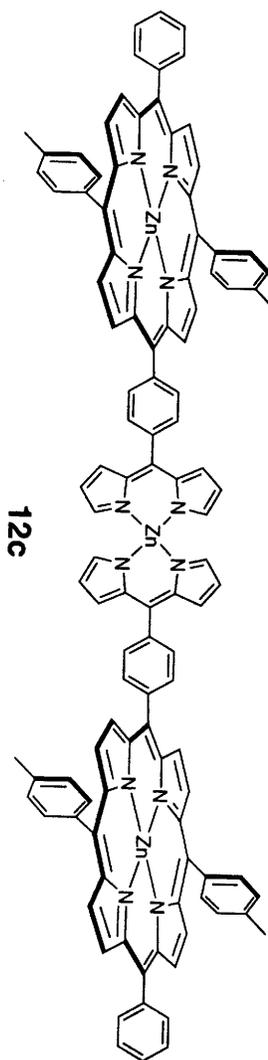
INSTRUN TOP
OPID N. Srinivasan
SERIAL 015900
AQ DATE Wed Nov 28 10:13:53 2001
PATH /data/chemistry/LINDSEY/LIANHE
POLARI POS
APC_Pm Reflector
700 50000
NO SHOTS 100
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
DM 1.00 [ns]
DELAY 0 [ns]
UIs1 20.81 [KV]
UIs2 18.70 [KV]
U-ref1 7.50 [KV]
U-ref2 10.00 [KV]
U-ref3 0.00 [KV]
U-ref4 1.50 [KV]
U-ref5 1.50 [KV]
U-ref6 2.00 [KV]
REPHZ 1.00 [Hz]
ATTEN 40.0
M.I 2067125.193
M.I2 333.982
M.I3 0.000
NORMED NO
GROSS YES
GROSSLY short
DEFLOW no
FLNSRD no
FLNSRD no
UTSZRD no
DZAZL 510.84 [Da]
DZAZL 700.84 [Da]
RENDVAL 0.33
ISZRDV 0.28
CMT1 Zn-Por-dp + Zn(OAc)2. final
CMT2 atcn = 40. shot = 100
  
```

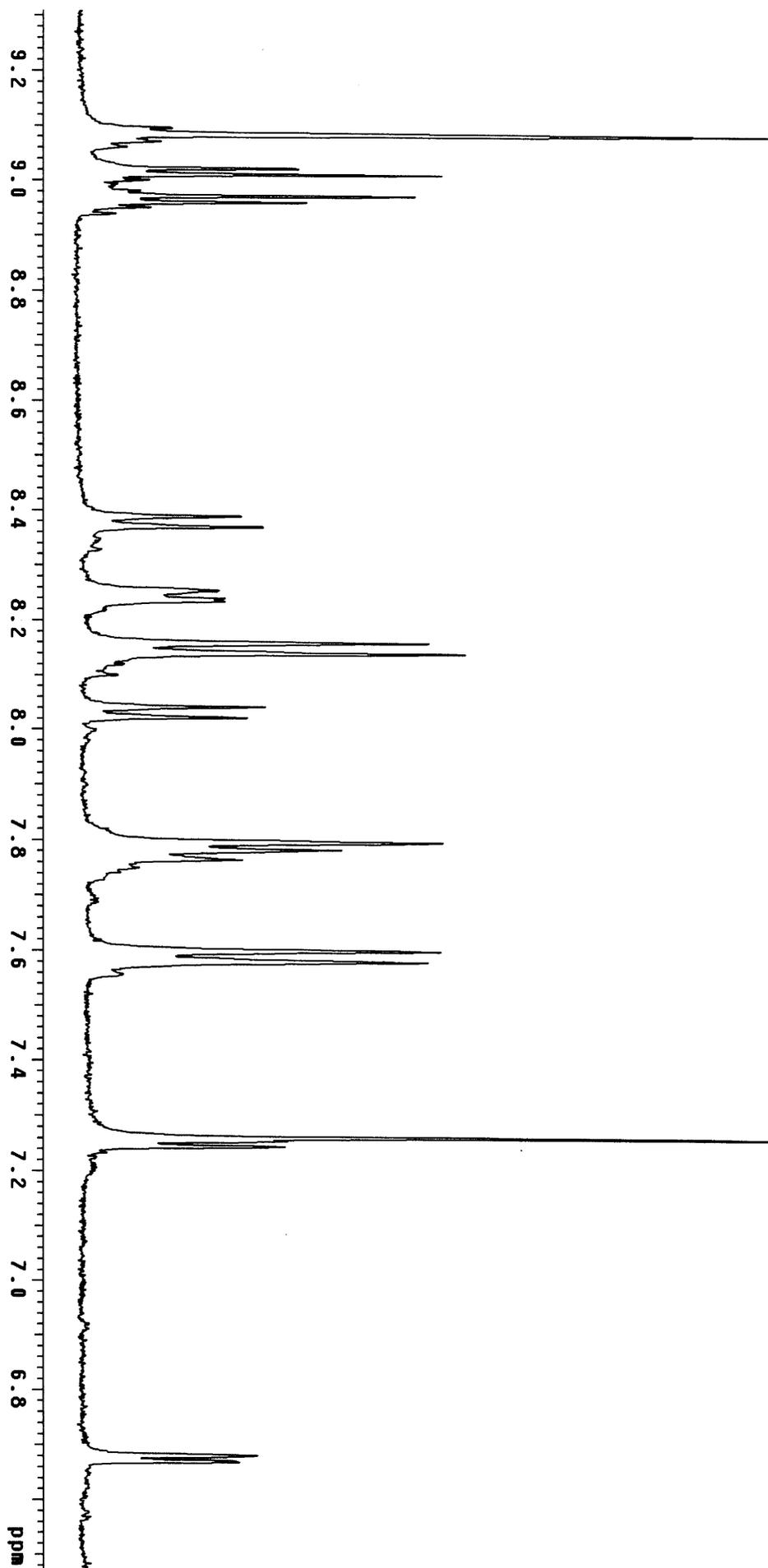


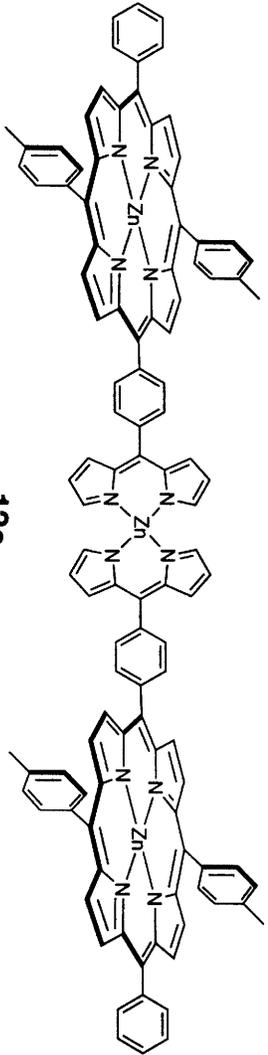
INSTRUM TOP
 DP12 N. Srinivasan
 SPMUM 020201
 AC DATE Sun Mar 10 15:44:34 2002
 PATH /data/chemistry/LINDSEY/LIANHE
 POLAKI
 POS
 APOE_m Reflector
 TO 50000
 NSHOOTS 50000
 SMOPTIS1 0
 SMOPTIS2 0
 SMOPTIS3 0
 DM 1.00 [ns]
 DELAY 0 [ms]
 U1s1 20 [KV]
 U1s2 18.70 [KV]
 U1ens 7.50 [KV]
 U1iams 10.00 [KV]
 RefFull 0.00 [KV]
 Udel 1.50 [KV]
 UdelR 2.00 [KV]
 REPHZ 1.00 [Hz]
 ATTEM 30.0
 M1 2073865.734
 M12 333.982
 M13 0.000
 HITORNO no
 G2EN no
 GDEPLY short
 DETON no
 FLNSRND no
 DISRND no
 DISRND no
 DPACLI 510.84 [Da]
 DPMS 700.00 [Da]
 PMS 0.91
 LBNDVAL 0.28
 ISZBNDV 0.91
 CMT1 Zn-Zn-Zn-2, pure
 CMT2 Attn=30, shots = 40



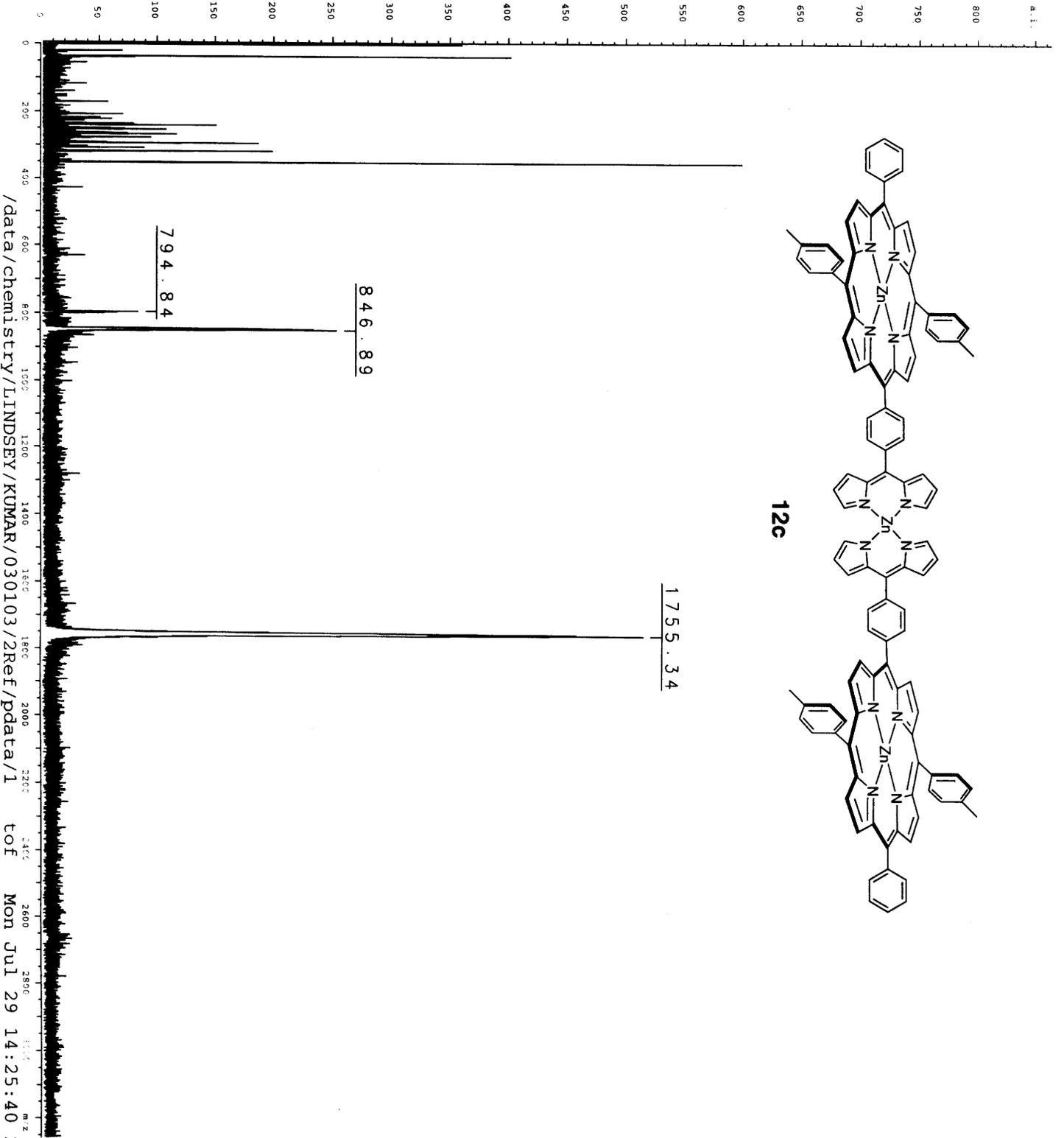


12c





12c

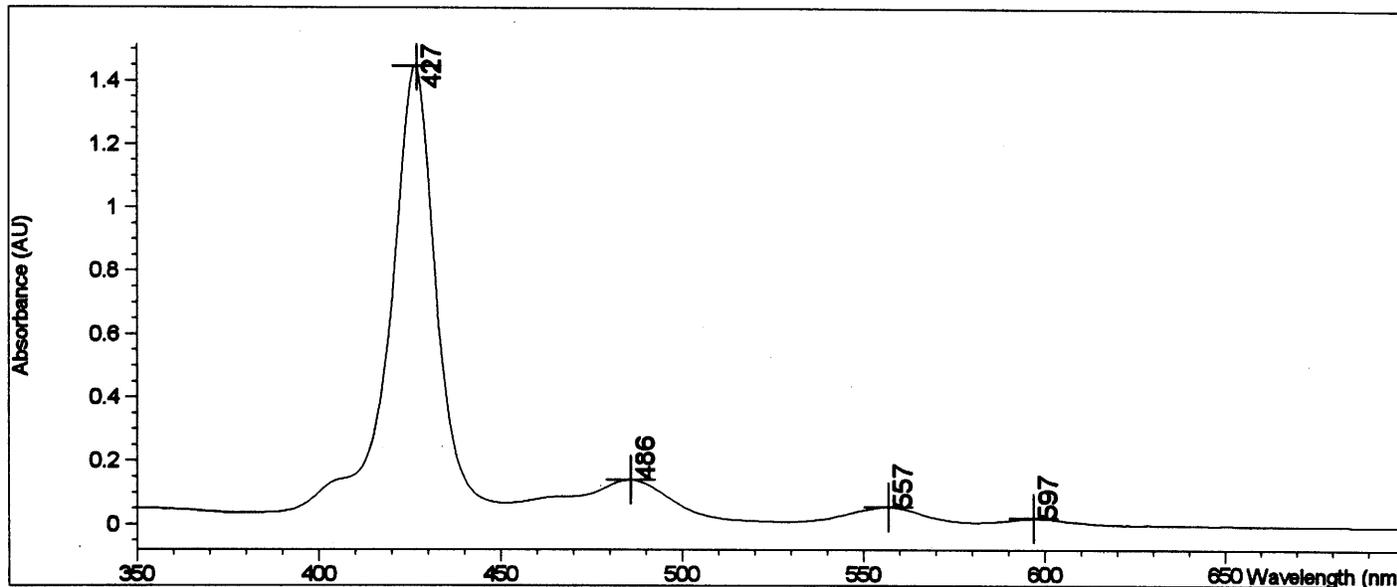


```

INSTRUM TOP
OpId N. Srihivassan
SMPNAM 030103
AQ_DATE Mon Jul 29 14:14:08 2002
PATH /data/chemistry/LINDSEY/KUMAR
DATA /data/chemistry/LINDSEY/KUMAR
FOUNT 05
FOOPM Reductor
TP 40000
NOSHOTS 50
SMONUM 0
SMOPTS1 0
SMOPTS2 0
SMOPTS3 0
SMOPTS4 0
SMOPTS5 0
DELAY 1.00 [ms]
Uis1 0 [ms]
Uis2 20.00 [KV]
Uref1 18.70 [KV]
Uref2 0.00 [KV]
Ugens 7.50 [KV]
Uref3 14.00 [KV]
Uref4 14.00 [KV]
Uaef1 1.50 [KV]
Uaef2 0.00 [KV]
Uaef3 2.00 [KV]
REPH2 1.00 [Hz]
ATTEN 25.0
M1 20719.2
M2 333.982
M13 0.000
HITURBO no
GDEON yes
GDEPLY short
DEFLON no
KERSND no
KANSND no
UIS2BND no
DRCAL1 510.84
DPMASS 700.00 [Da]
RRNDVAL 0.33
LBNVAL 0.28
ZLNVAL 0.28
CMT1 km-321 7/29/02
CMT2 ac 28
  
```

Method file : <untitled>
Information : Default Method
Data File : <untitled>

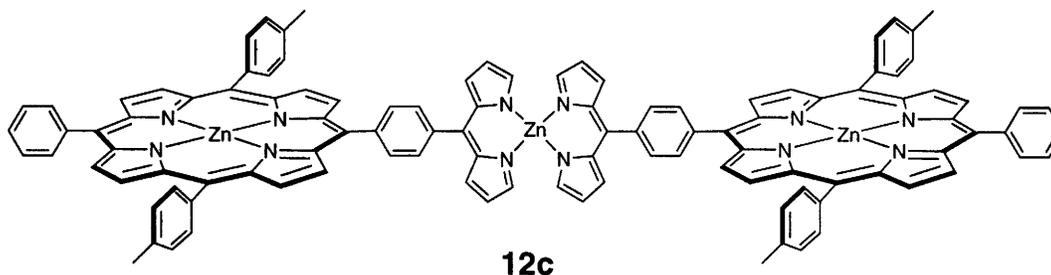
Overlaid Spectra:

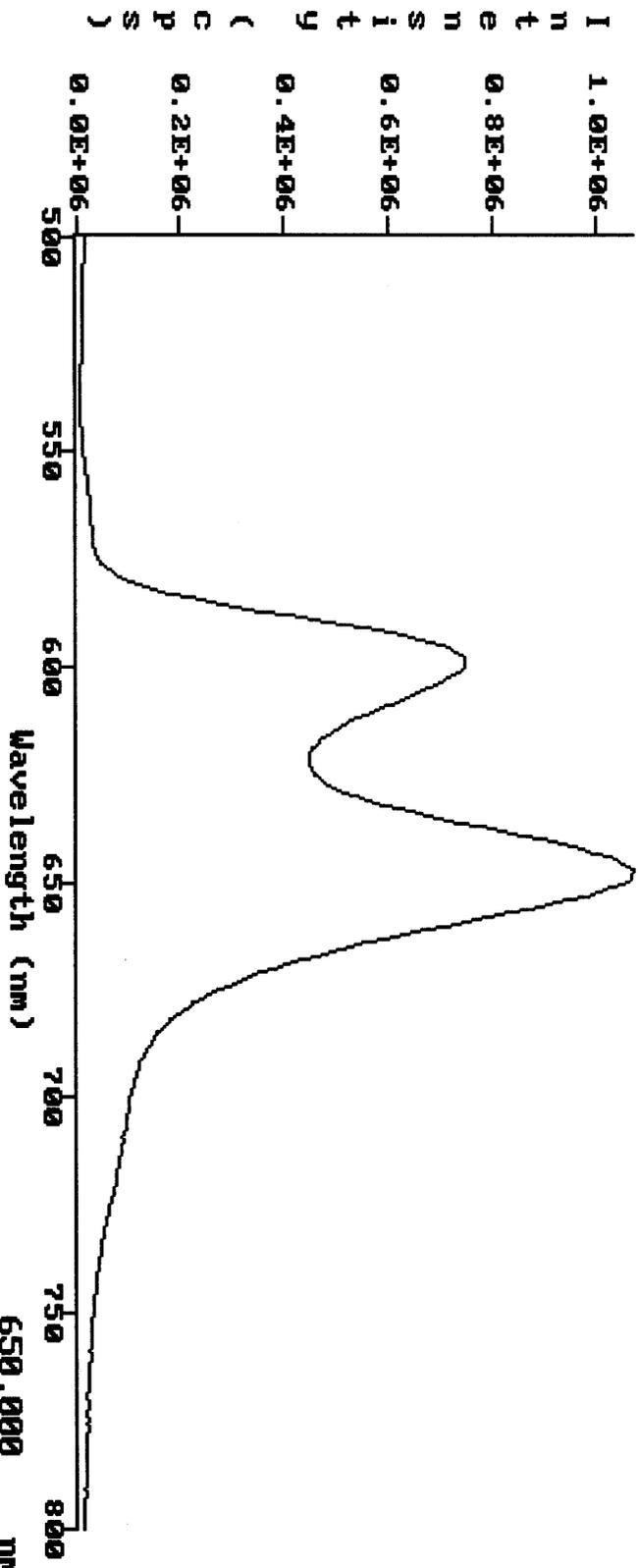


#	Name	Peaks (nm)	Abs (AU)
1		427.0	1.44550
1		486.0	0.14018
1		557.0	5.4822E-2
1		597.0	1.8900E-2

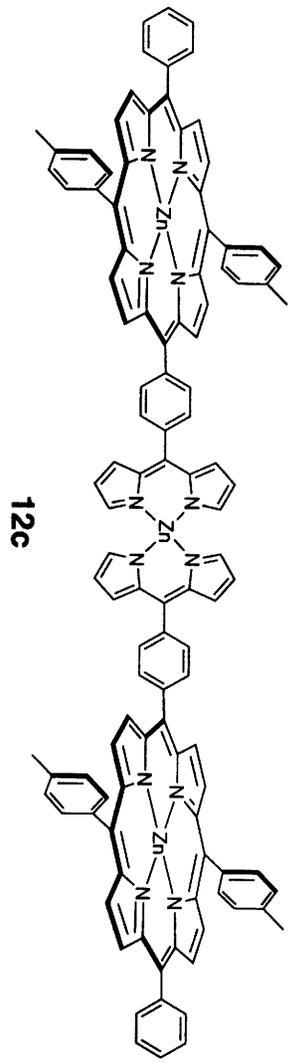
Report generated by :

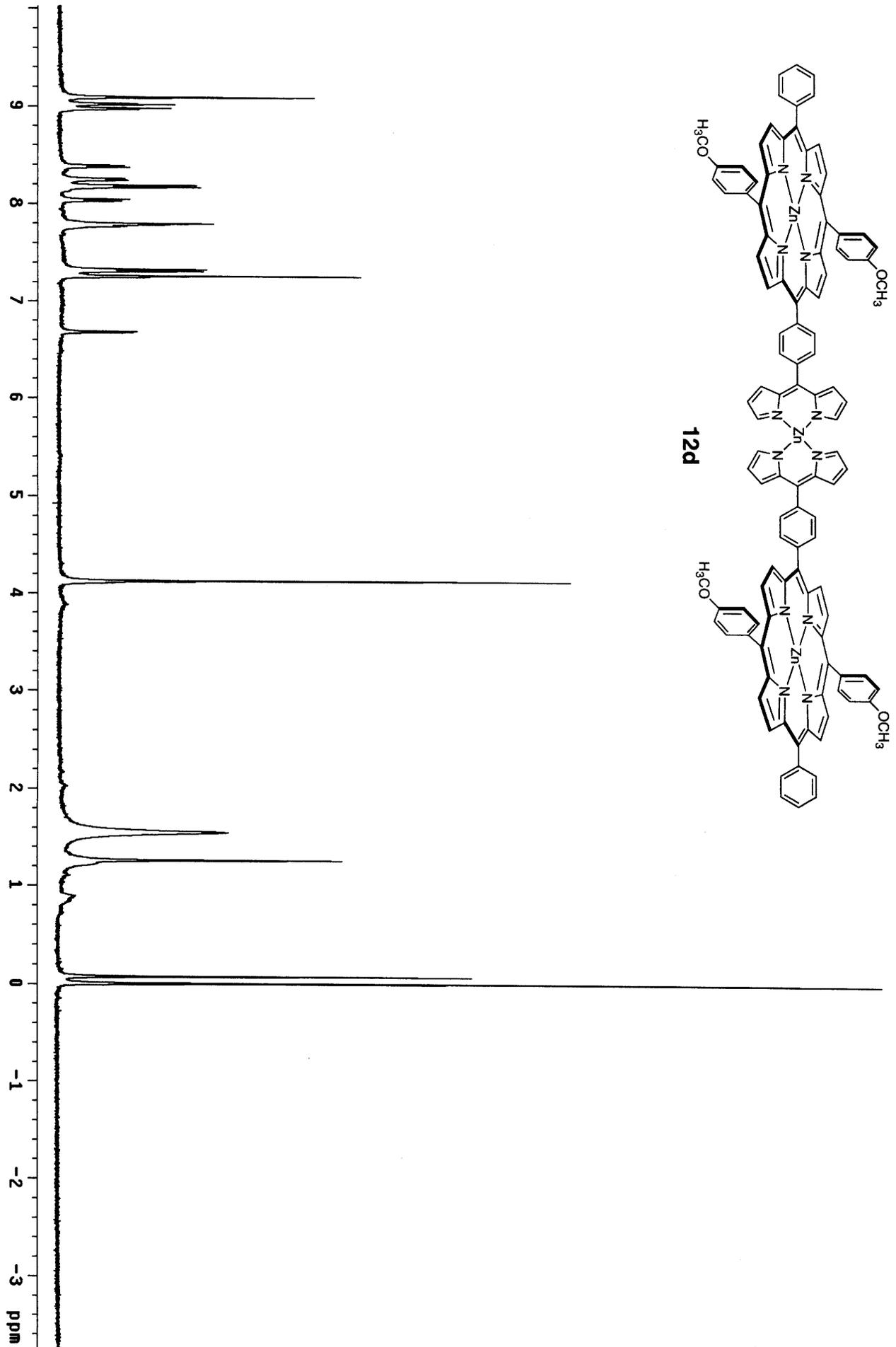
Signature:

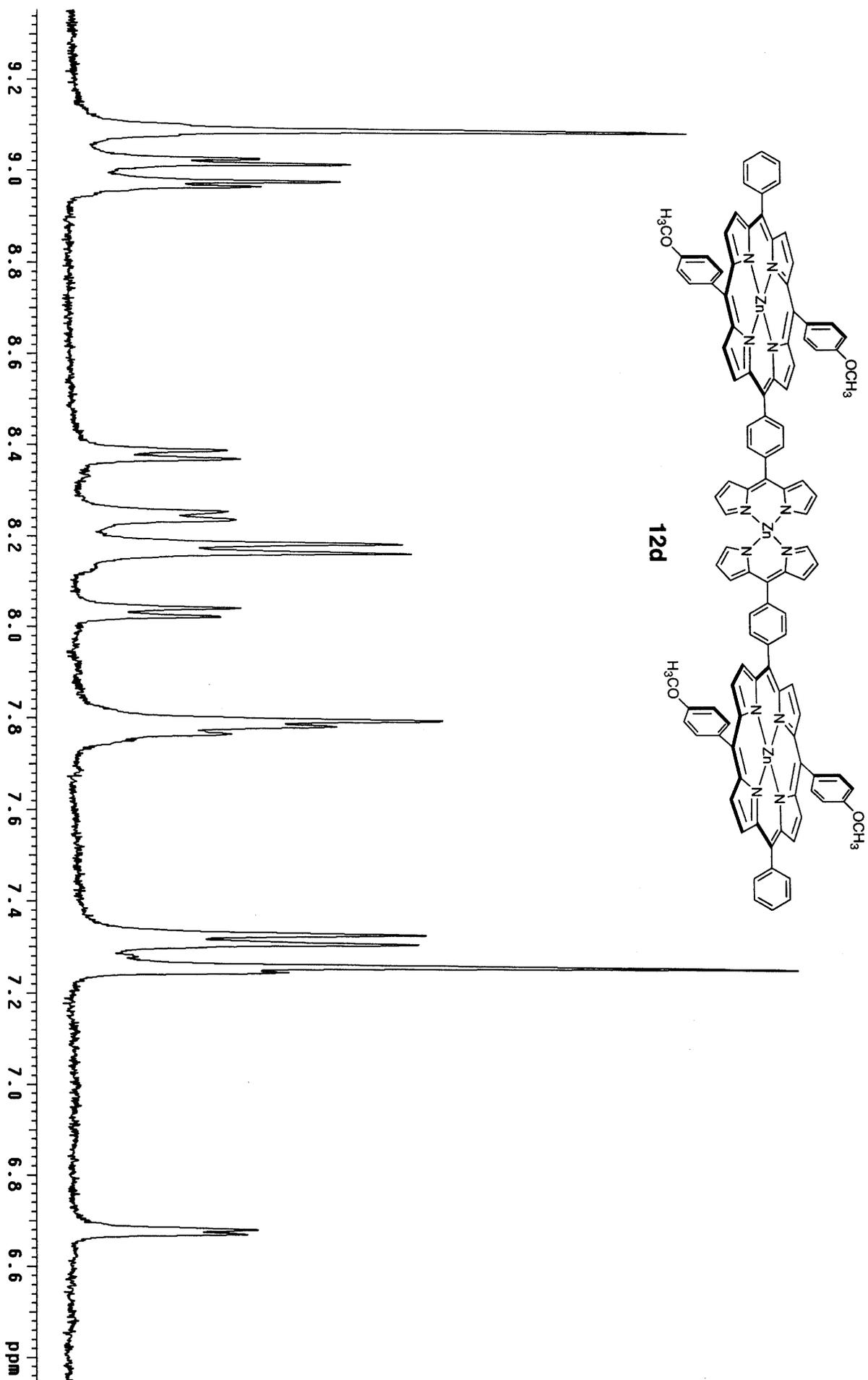


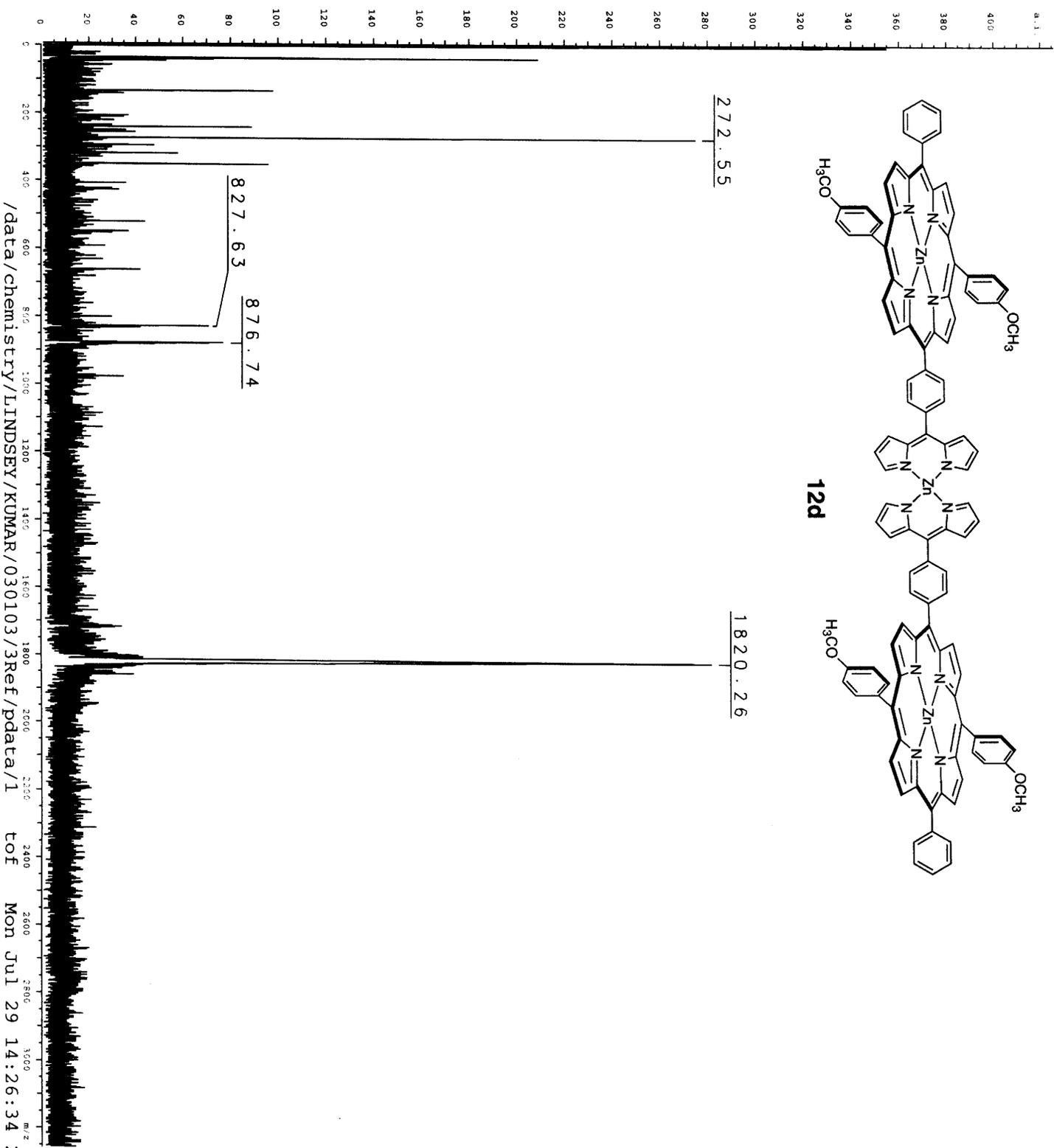
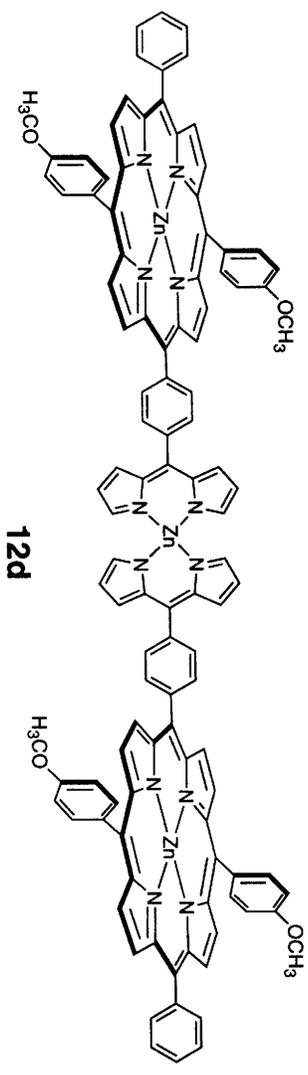


F1 HELP F2 SCRN F3 PAUSE F4 MAIN F5 F6 GRAPH F7 ACCS'Y F8 EXPT F9 STATUS F10 H V F11 F12 REGS







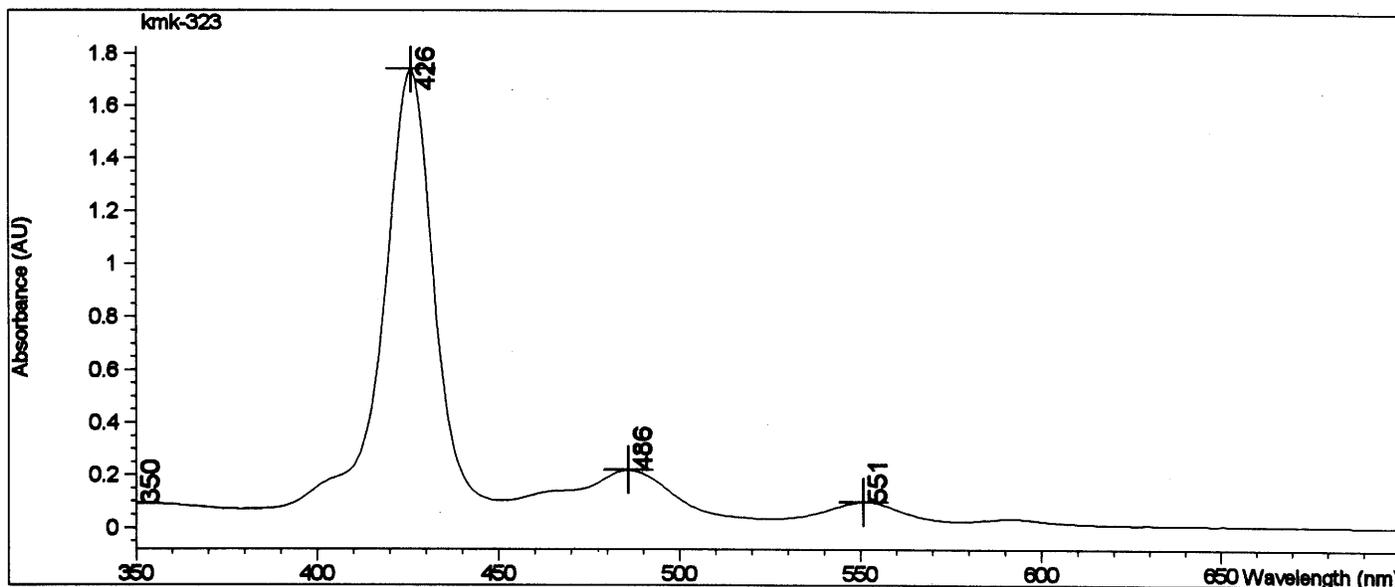


```

INSTRUM TOP
OPID N. Srinivasan
SRNAM 030103
AQ DATE Mon Jul 29 14:23:35 2002
PDIR /data/chemistry/LINDSEY/KUMAR
SRVRY /data/chemistry/LINDSEY/KUMAR
AOP_m Reflector
TD 40000
NOSHOTS 50
SMONUM 0
SMPTST 0
SMPTST2 0
SMPTST3 0
DW 1.00 [ns]
DELAY 0 [ns]
U1s1 20.00 [KV]
U1s2 18.70 [KV]
U1e1 0.00 [KV]
U1e2 0.50 [KV]
U1e3 10.50 [KV]
U1e4 0.00 [KV]
UaetL 1.50 [KV]
UaetR 0.00 [KV]
UaefL 2.00 [KV]
UaefR 1.00 [KV]
REPRZ 2.00 [Hz]
ATTEN 207192.955
ML1 333.982
ML2 0.000
ML3 0.000
HITURBO no
GDBON yes
GDEBL short
DETRON no
DETRND no
LINSRD no
UISARBD no
DPCALI 510.84 [Da]
DPMASS 700.00 [Da]
RRNDVAL 0.33
LNSNDV 0.28
CMT1 kml-133 7/29/02
CMT2 att 28
  
```

Method file : <untitled>
 Information : Default Method
 Data File : <untitled>

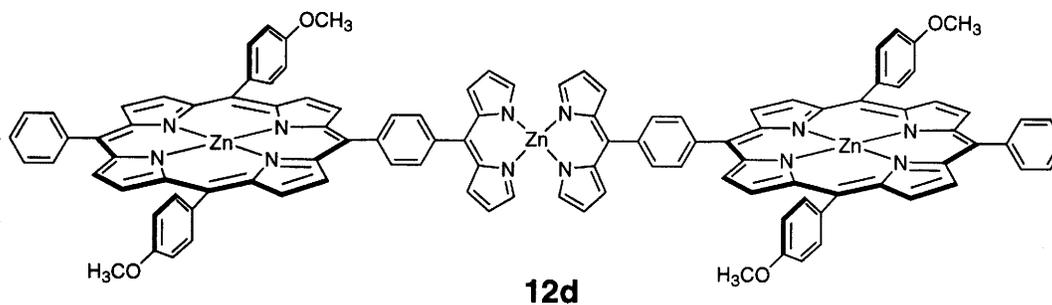
Overlaid Spectra:



#	Name	Peaks (nm)	Abs (AU)
1	kmk-323	426.0	1.74090
1		486.0	0.22075
1		551.0	9.9855E-2
1		350.0	9.2105E-2

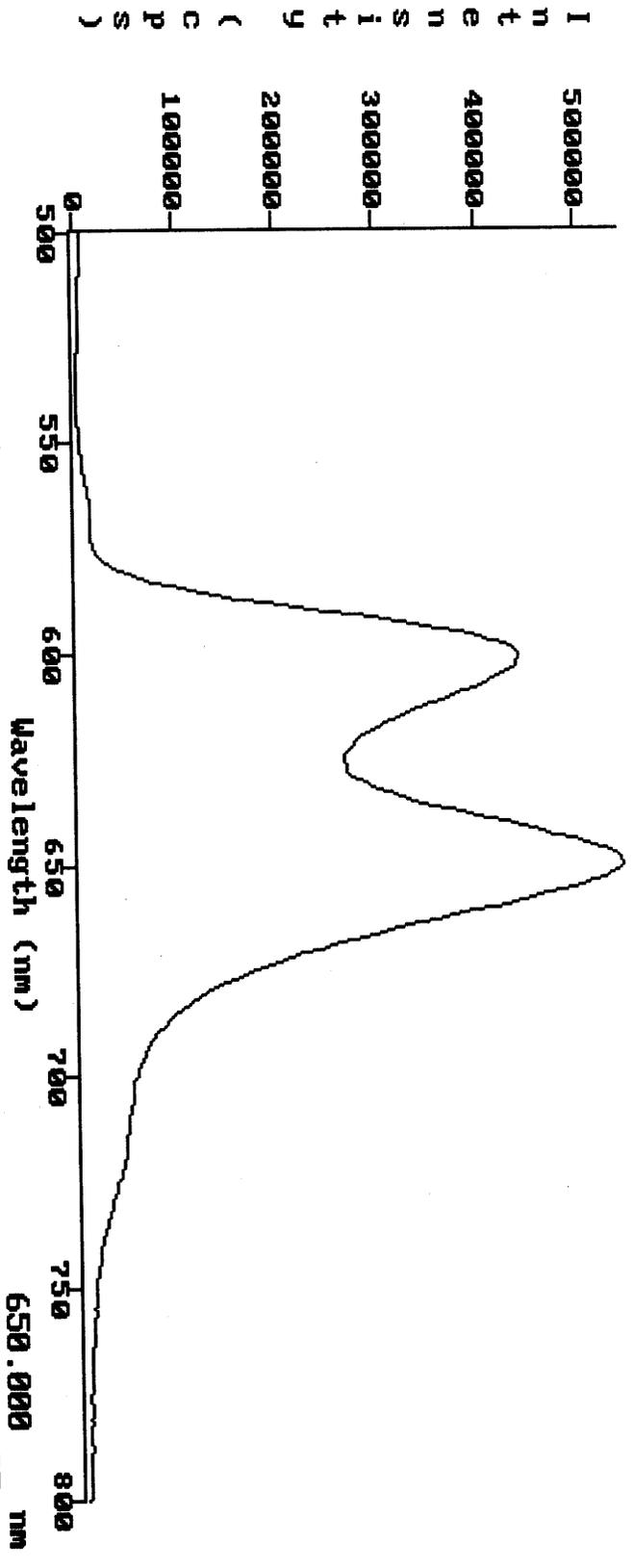
Report generated by :

Signature:



SP14
0:47

KNK-323M.SPT knk-323 M485(500-800)



- F1 HELP
- F2 SCRN
- F3 PAUSE
- F4 MAIN
- F5
- F6 GRAPH
- F7 ACCS'Y
- F8 EXPT
- F9 STATUS
- F10 H V
- F11
- F12 REGS

