Supporting Information Available

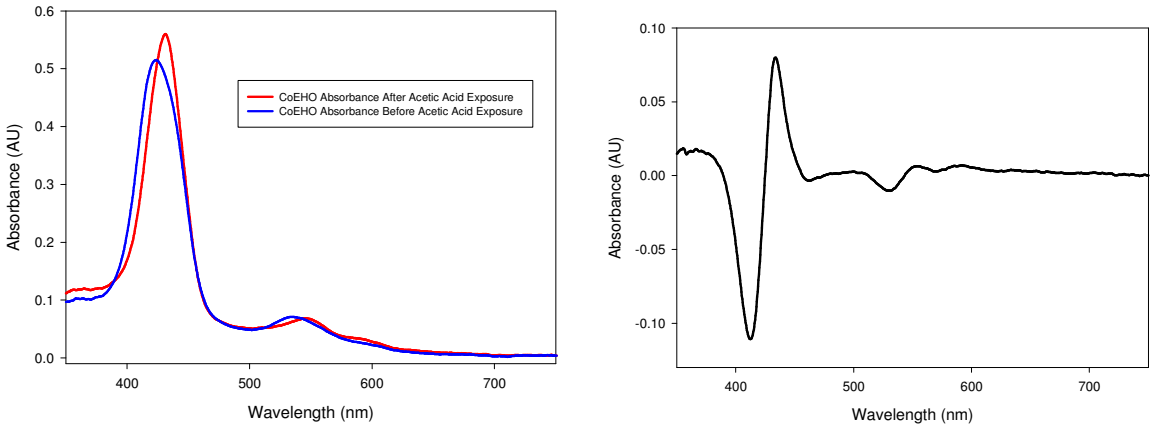
The analyte vapour concentration for each of the analytes held at 0°C in the iced water bath was estimated by extrapolating the data found in the CRC handbook of chemistry and physics : a ready reference book of chemical and physical data / editor Robert C. Weast. 58th ed. Cleveland (Ohio) : CRC Press, 1977. The results are shown in table S1

Vapour pressure data points either side of 0°C was not available for trimethyl phosphate or octylamine. Therefore the values for trimethyl phosphite was estimated by extrapolated a reference for the vapour pressure at 25°C using the average gradient for all the analytes from the graph of log(vapour pressure) against (temperature)$^{-1}$. The concentration of octylamine was estimated using a curve fitted mid way between the available data for heptylamine and nonylamine

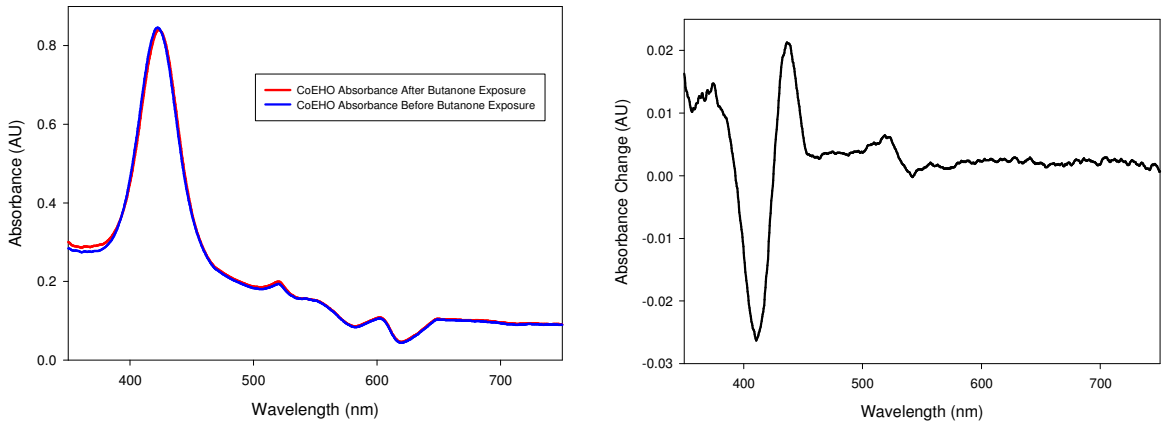
Table S1 Estimates of the various analyte concentrations

	P(ppm)
Acetic Acid	2588
Butanone	31989
Ethylacetate	31989
Hexanthiol	940
Hexylamine	2228
Octanal	670
Octanol	3
Octylamine (e)	183
Triethylamine	15136
Trimethylphosphite (e)	5864

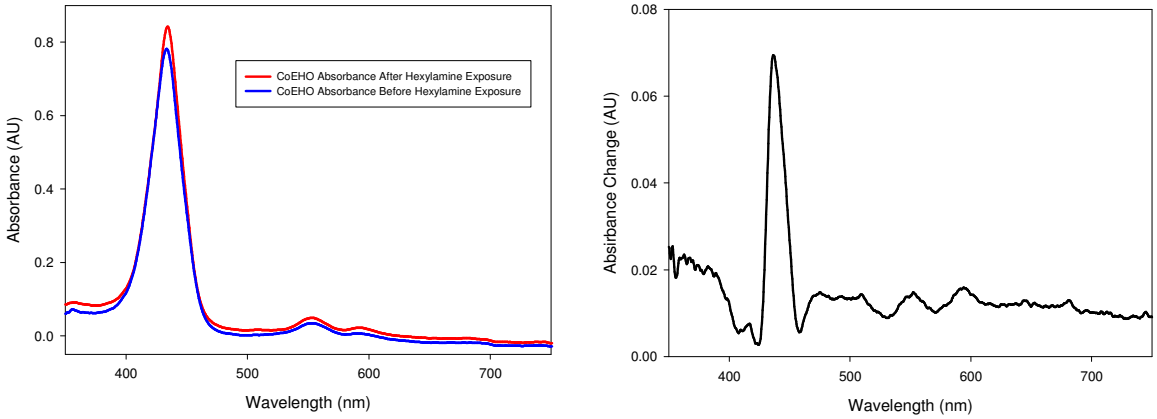
The UV Vis absorption spectra and the calculated difference spectra for each of the thin film exposures are shown below.



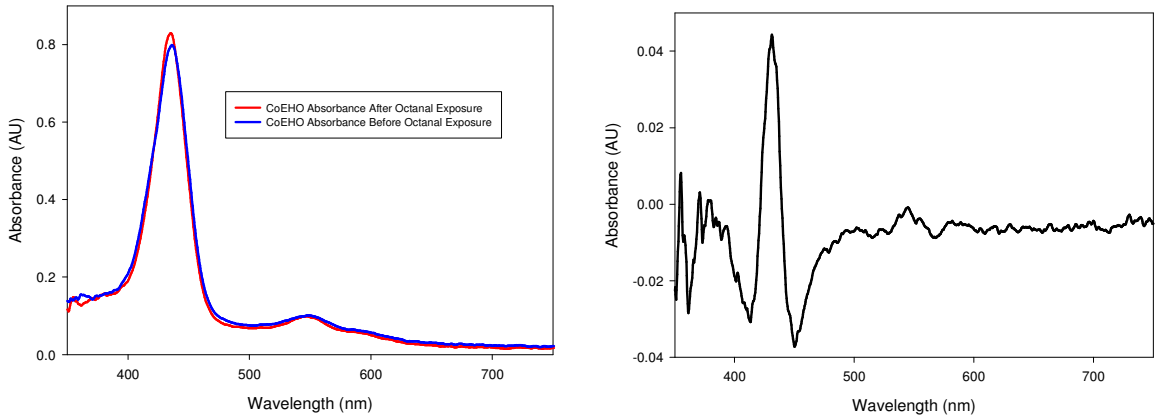
CoEHO absorbance spectra before (blue) and after (red) exposure to acetic acid along with the difference spectrum.



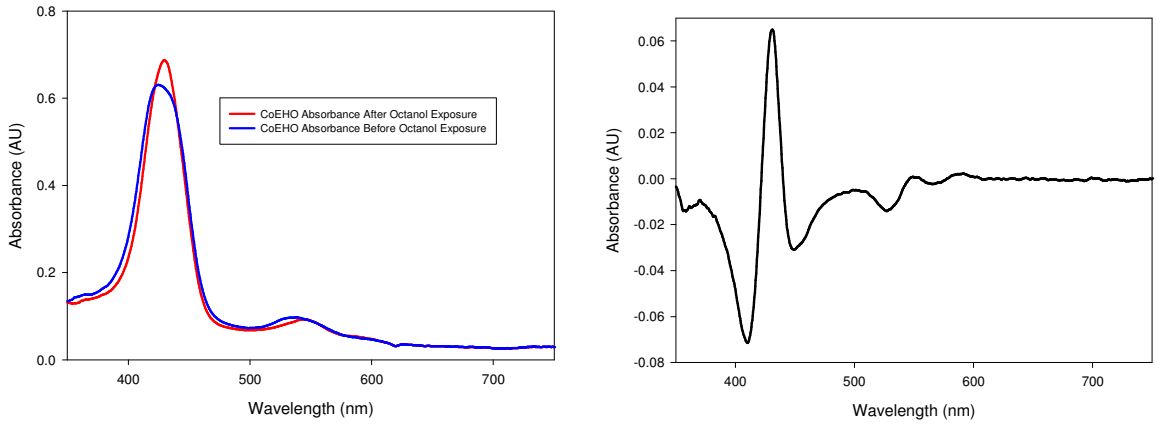
CoEHO absorbance spectra before (blue) and after (red) exposure to butanone along with the difference spectrum.



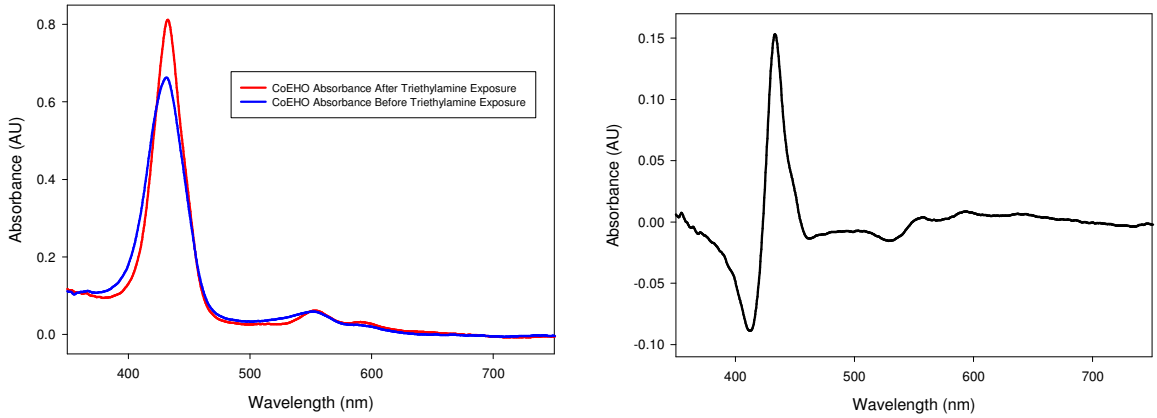
CoEHO absorbance spectra before (blue) and after (red) exposure to hexylamine along with the difference spectrum.



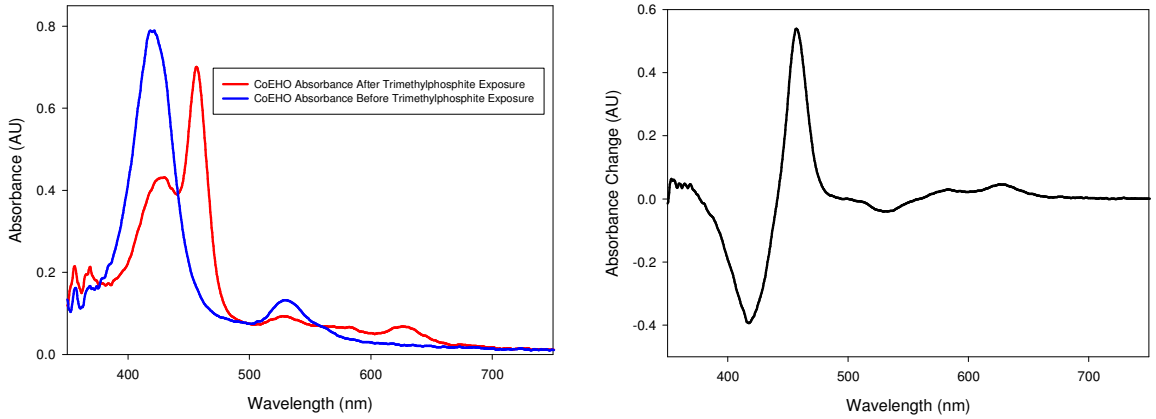
CoEHO absorbance spectra before (blue) and after (red) exposure to octanal along with the difference spectrum.



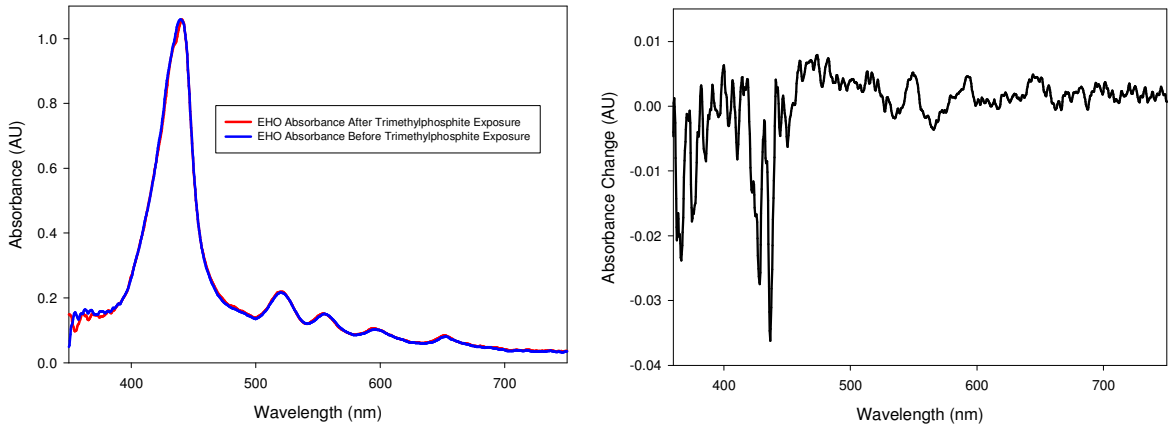
CoEHO absorbance spectra before (blue) and after (red) exposure to octanol along with the difference spectrum.



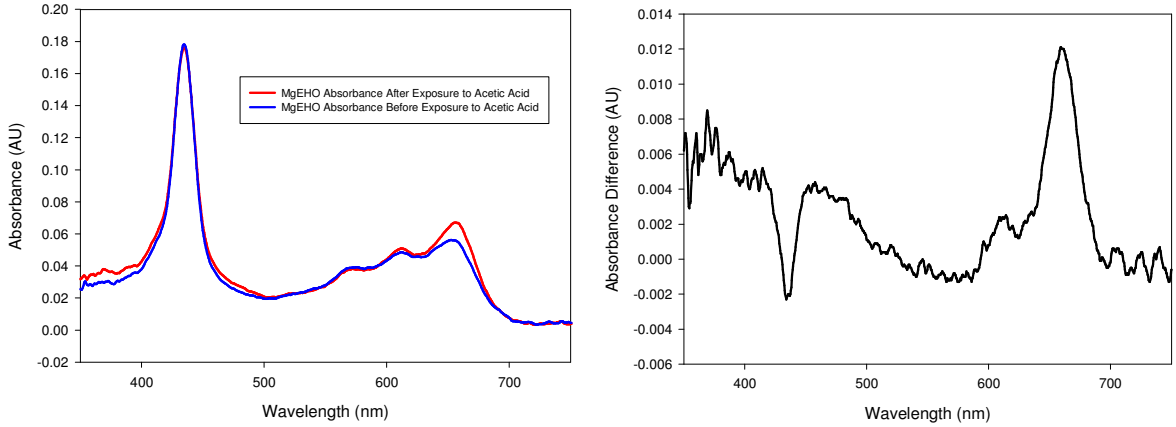
CoEHO absorbance spectra before (blue) and after (red) exposure to triethylamine along with the difference spectrum.



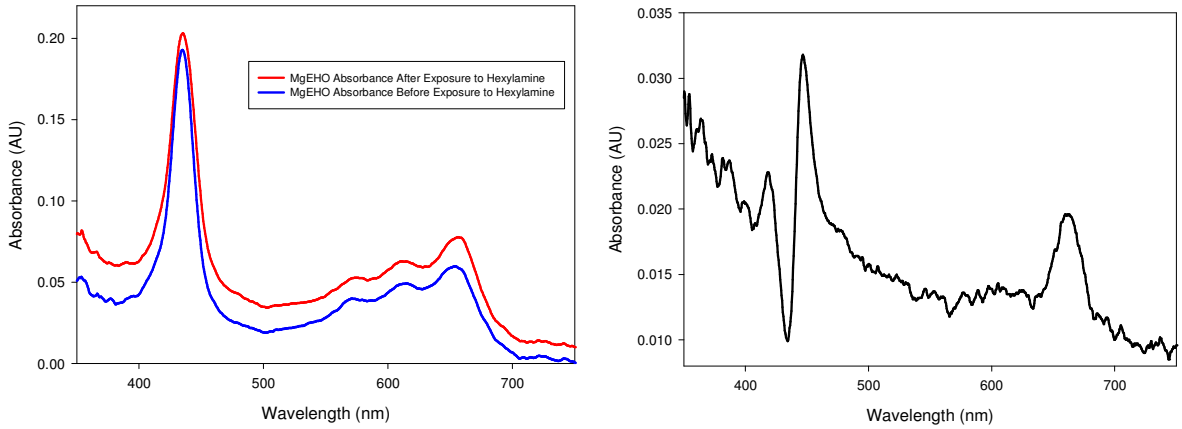
CoEHO absorbance spectra before (blue) and after (red) exposure to trimethylphosphite along with the difference spectrum.



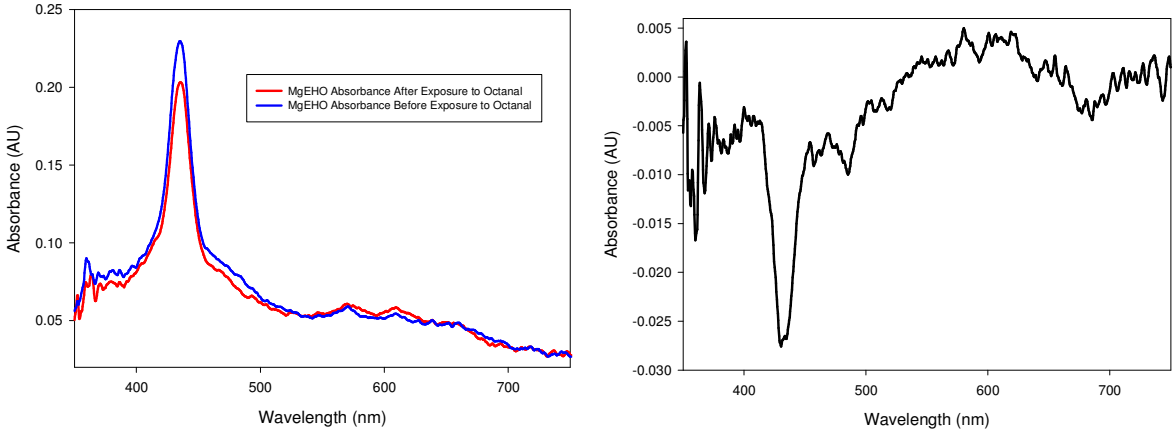
Freebase-EHO absorbance spectra before (blue) and after (red) exposure to trimethylphosphite along with the difference spectrum.



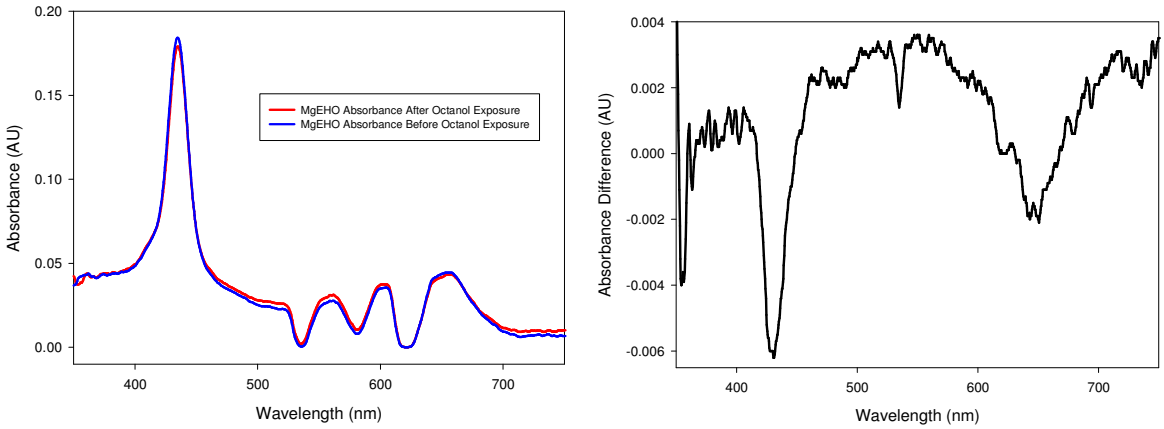
MgEHO absorbance spectra before (blue) and after (red) exposure to acetic acid along with the difference spectrum.



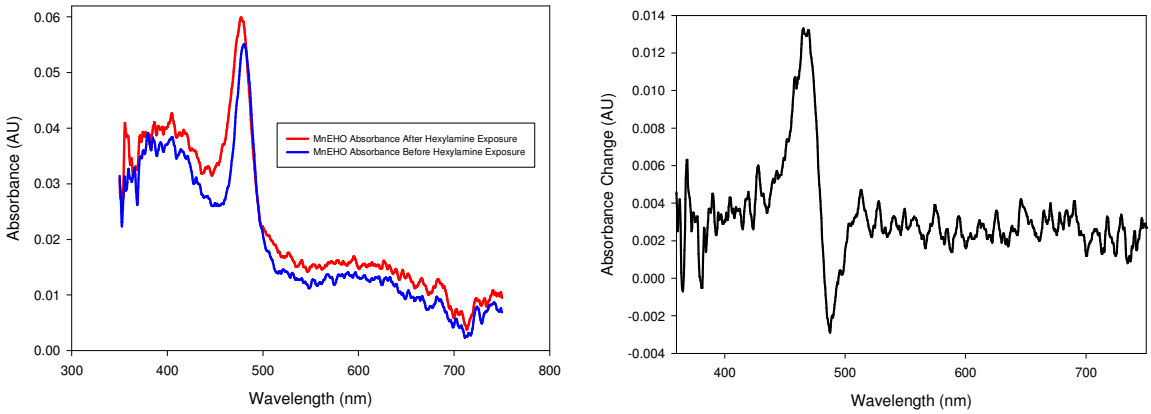
MgEHO absorbance spectra before (blue) and after (red) exposure to hexylamine along with the difference spectrum.



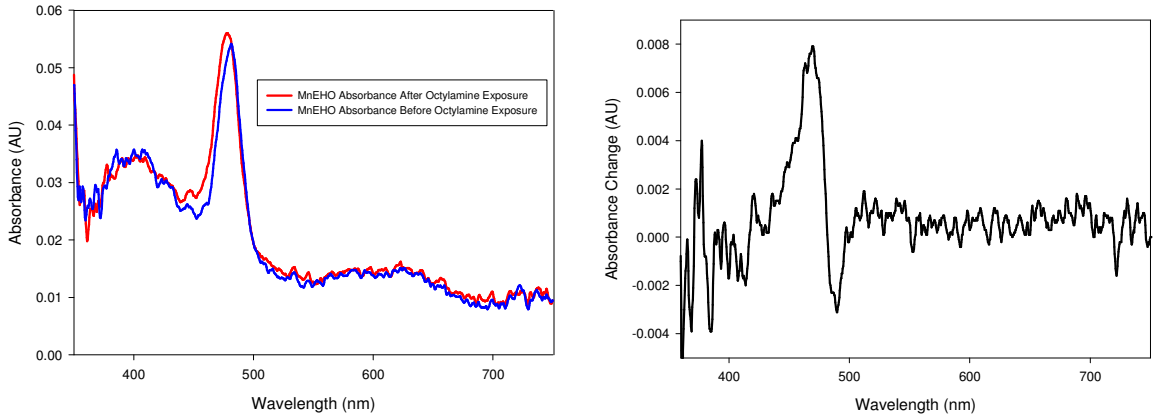
MgEHO absorbance spectra before (blue) and after (red) exposure to octanal along with the difference spectrum.



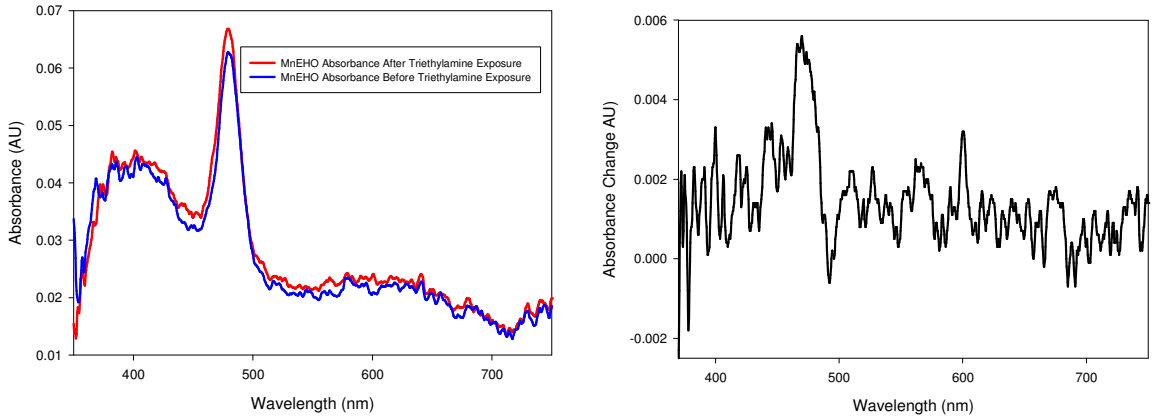
MgEHO absorbance spectra before (blue) and after (red) exposure to octanol along with the difference spectrum.



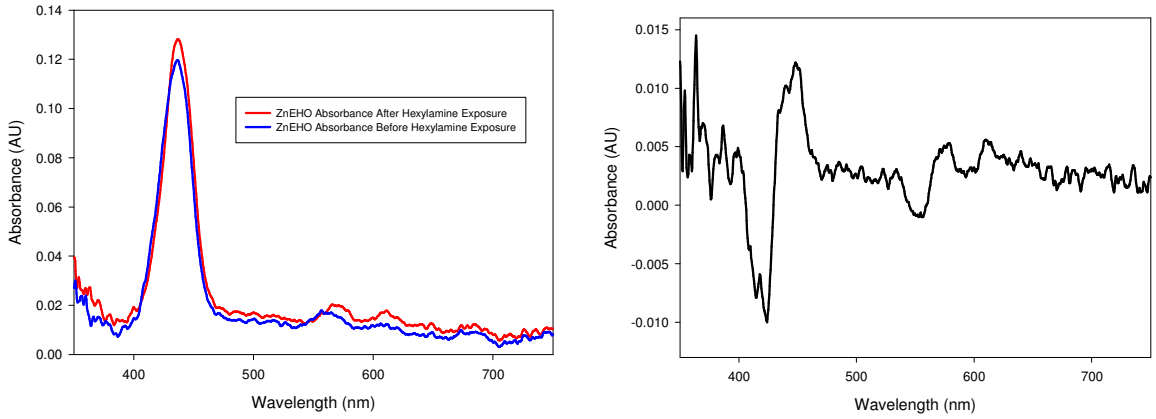
MnEHO absorbance spectra before (blue) and after (red) exposure to hexylamine along with the difference spectrum.



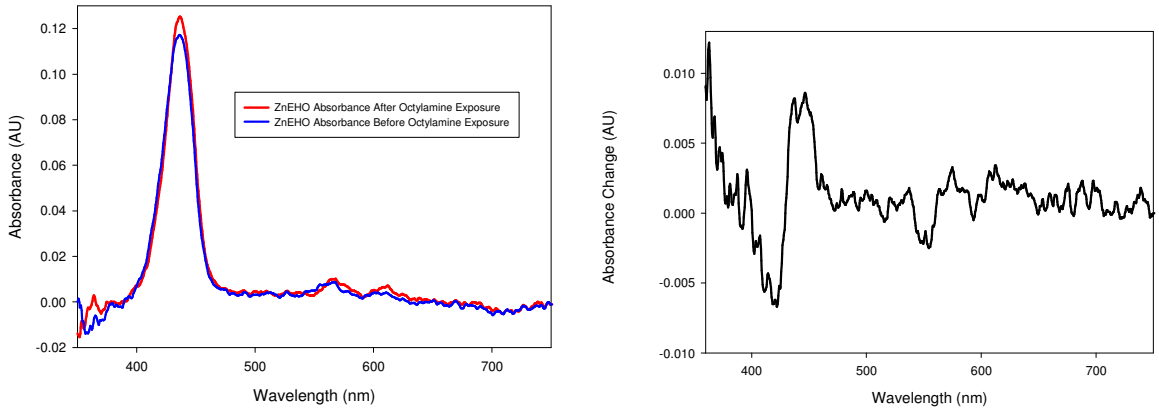
MnEHO absorbance spectra before (blue) and after (red) exposure to octylamine along with the difference spectrum.



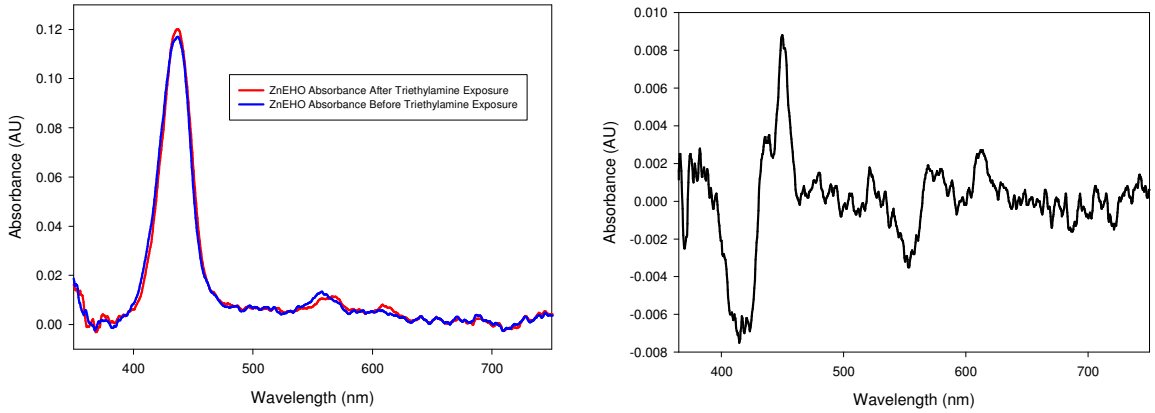
MnEHO absorbance spectra before (blue) and after (red) exposure to triethylamine along with the difference spectrum.



ZnEHO absorbance spectra before (blue) and after (red) exposure to hexylamine along with the difference spectrum.



ZnEHO absorbance spectra before (blue) and after (red) exposure to octylamine along with the difference spectrum.



ZnEHO absorbance spectra before (blue) and after (red) exposure to triethylamine along with the difference spectrum.