

Supporting Information

Hydrothermal synthesis and high photocatalytic activity of 3D wurtzite ZnSe hierarchical nanostructures

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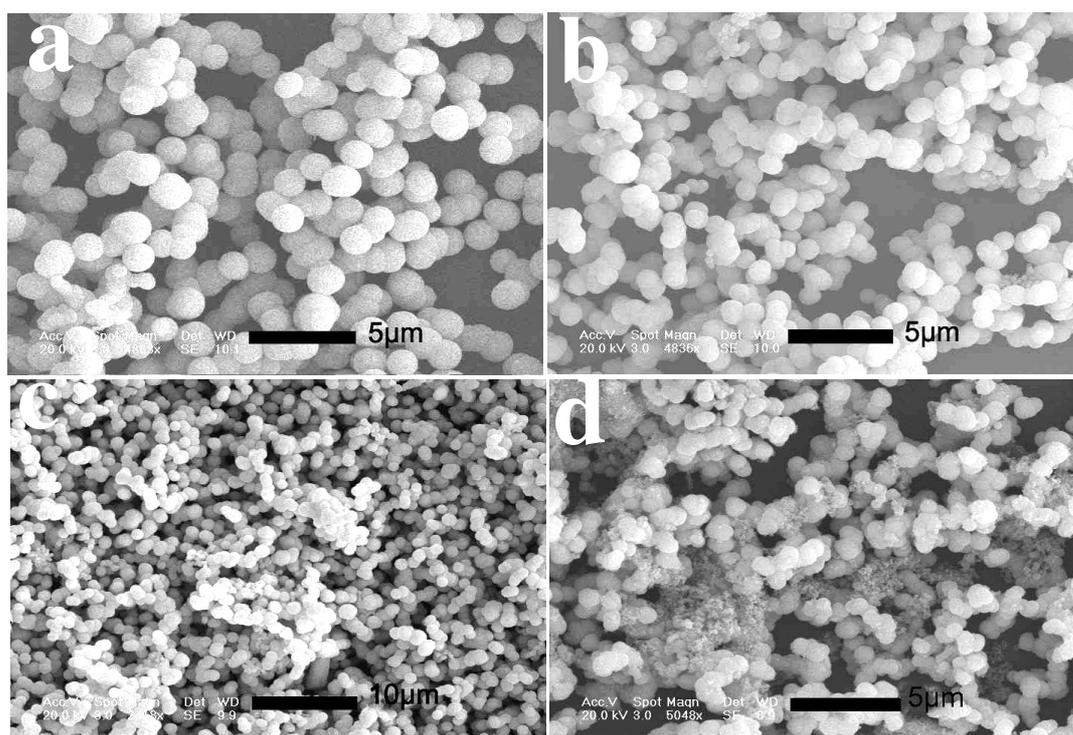


Figure S1. SEM images of the obtained ZnSe products (a) without EDTA and with (b)CTAB (c) AOT and (d) NH₃·H₂O.

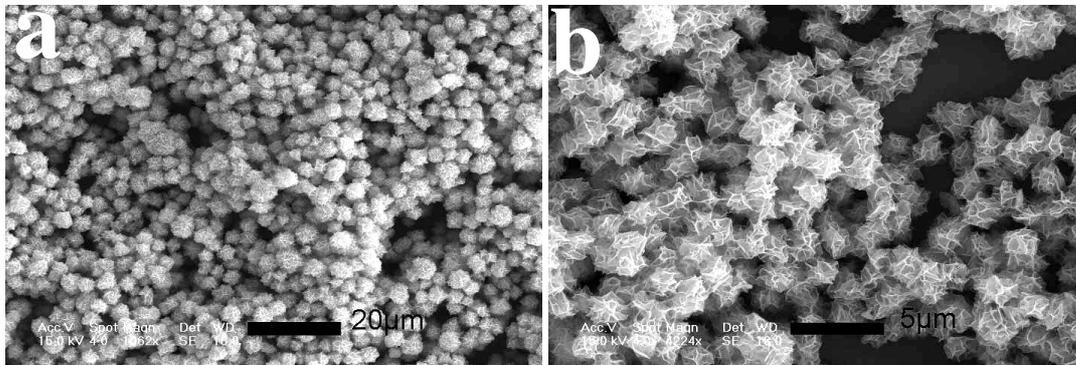


Figure S2. SEM images of the obtained ZnSe products at different reaction temperatures: (a) 100 °C, (b) 140 °C.

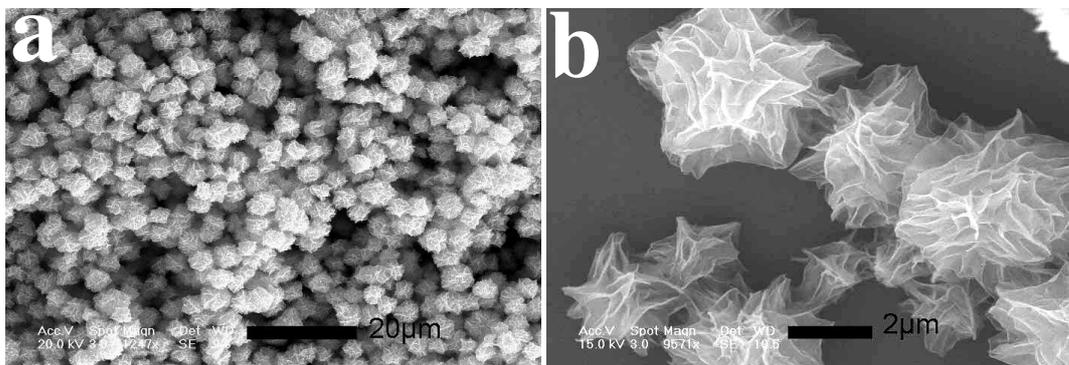


Figure S3. SEM images of the obtained ZnSe products at different reaction times: (a) 40min, (b) 12h.

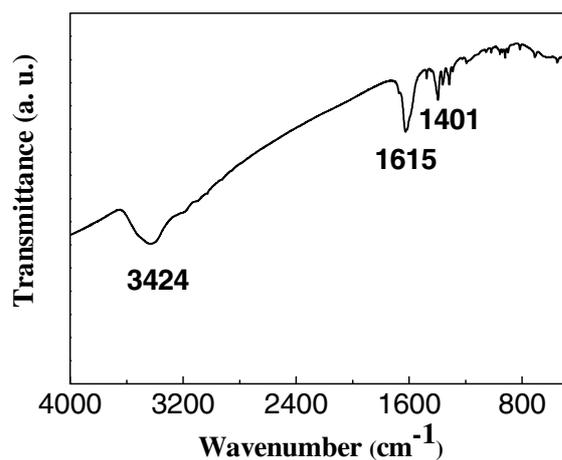


Figure S4. IR spectrum of the ZnSe nanostructures. Weak bands at 1615 and 1401 cm⁻¹ which are associated with asymmetric and symmetric (COO⁻) stretches vibration, respectively, and they are the characteristic functional groups of Zn(II)(EDTA) complex, suggesting that additive EDTA molecules remain strongly associated with the ZnSe crystals even after extensive washing. The absorption peaks located at about 3424 cm⁻¹ correspond to the O—H stretching vibration, which results from the water adsorbed onto the surface of the sample.

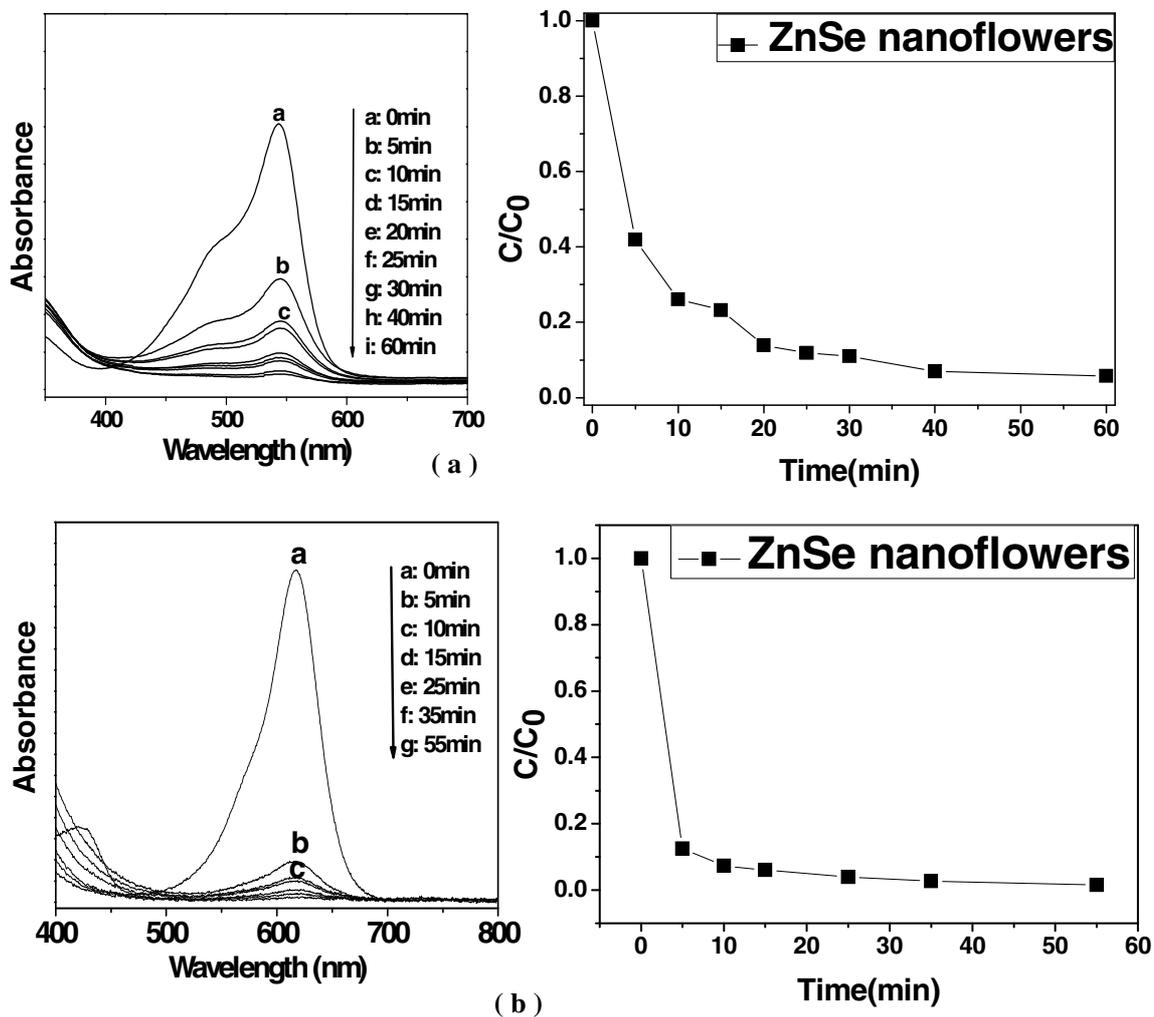


Figure S5. Absorption spectrum and photocatalytic degradation of (a) fuchsine acid and (b) malachite green in the presence of ZnSe nanoflowers.

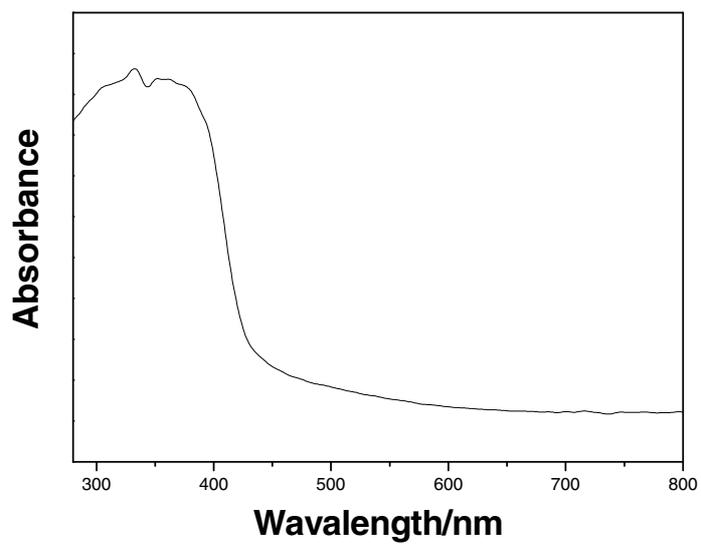


Figure S6. UV-vis diffuse reflectance spectra of ZnSe nanoflowers. The energy of the band gap of ZnSe nanoflowers estimated from the main absorption edges of the UV- visible diffuse reflectance spectrum is 2.8 eV.

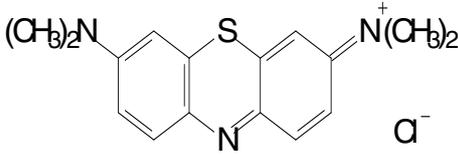
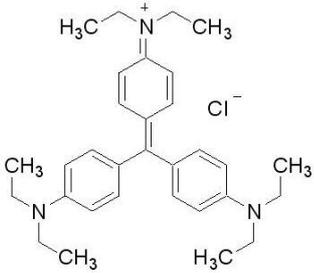
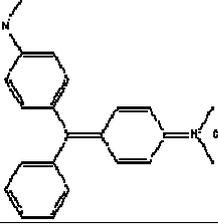
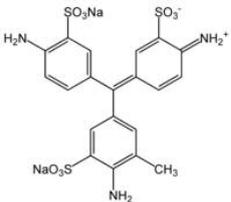
Dye	Chemical formula	Mw (g/mol)	λ_{max} (nm)
Methylene blue		356	663
Ethyl violet		492.14	593.5
Malachite green		364.95	618
Fuchsine acid		585.54	545

Table S1. Molecular structures and chemical properties of the four dyes photocatalytically destroyed.