Electronic Supplementary Material (ESI) for Dalton Transactions.

Preparation of colloidal solution of silica encapsulating cyanobiphenyl units-capped ZnO QD emitting in the blue region

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Experimental details

1. Raw Materials

Zinc acetate dehydrate ($Zn(Ac)_2.H_2O$, 99,5%, Fluka), Tetramethylammonium-hydroxide (TMAOH, 25 ˚/◦ in methanol, Alfa Aesar), Dimethyl sulfoxide, Ethanol (Absolute, Sigma-Aldrich), Tetraethyl orthosilicate (TEOS, 99%, Merck) were used without further purification.Carboxylic acids $HL^{3,5}$ and $HL^{3,4,5}$ were synthesized by using reported procedures and the analytic data showed conformity with previous results.[1, 2]

2. Preparation of ZnO-$_{Cya}$@SiO_2 core-shell nanocolloids

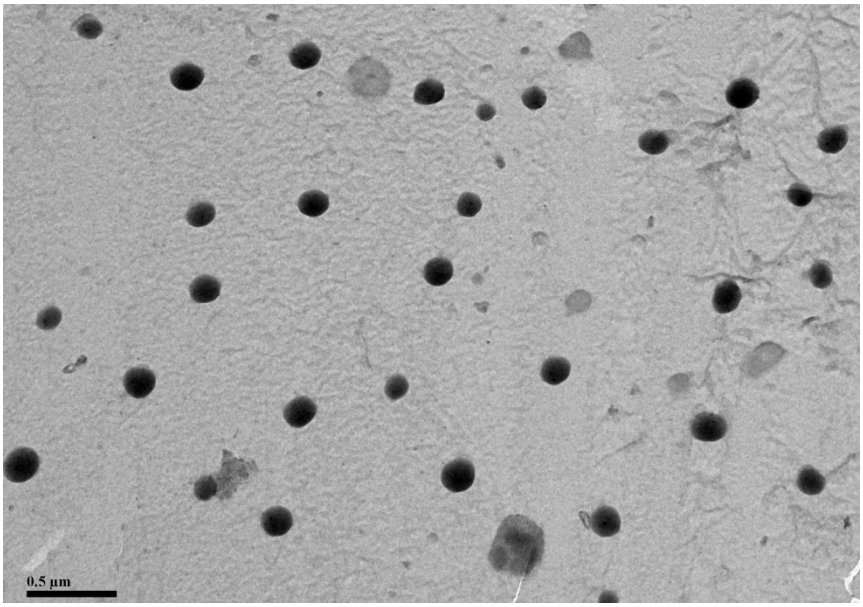
ZnO QD were prepared usingsimilar route as published by Rakshit *et al*.[3] which used DMSO instead of alcohol as our previous work.[4] In more detail, for the synthesis of the ZnOQD, 0.1 M of $Zn(Ac)_2.H_2O$ was dissolved in 30 mL of DMSO at room temperature then 1.26 mL of TMAOH was added, followed by stirring for two days. On the other hand, 41 mg of $HL^{3,5}$ were dissolved in 1 mL of DMSO and the solution was heated to 130 °C and then dropped very slowly on 3 mL of the ZnO colloidal solution followed by adding 2 mL of absolute ethanol. After an hour of continuous stirring, 30 µL of TMAOH and 200 µL of TEOS were added and the mixture stirred further for 2 days at room temperature. The solution was perfectly clear and remains like this several days. The precipitation of the nanoparticles of ZnO-Cya@SiO_2 is realized by adding ethanol and then centrifugation before redispersion in aqueous media.

3. Characterization

The X-ray diffraction patterns of the obtained nanocrystalline powders were recorded on a Bruker D8 X-ray diffractometer using Cu Kα1. The TEM images were recorded on a JEOL

JEM-1400 to 120 KV equipped by a camera CCD Gatan Orius SC 1000. The PL spectra and UV-Vis absorption data were recorded on a Horiba Jobin Yvon, Fluorolog-3 (FL3-22) fluorescence spectrophotometer and a Perkin Elmer Lambda 35 UV-Vis spectrophotometer respectively.

a)



b)

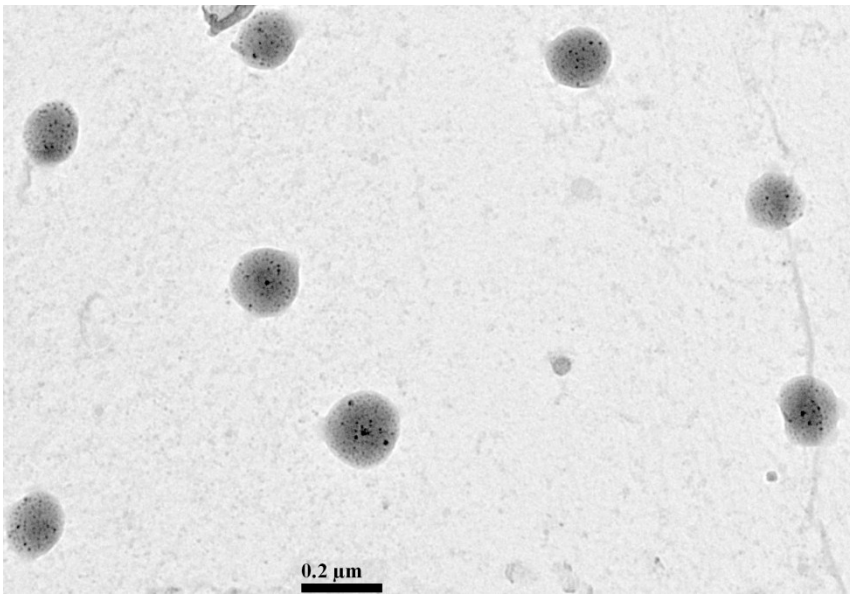


Figure S1. TEM images of ZnO-Cya@SiO2

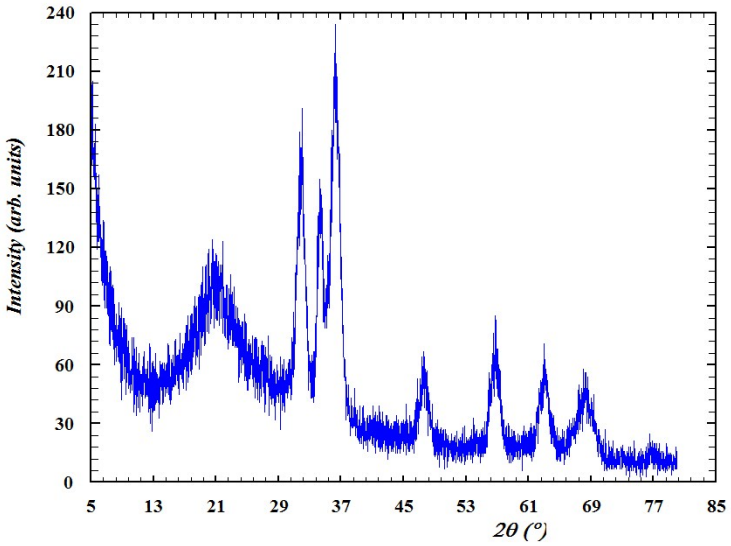


Figure S2. Powder XRD patterns for ZnO-$_{Cya}$@SiO_2

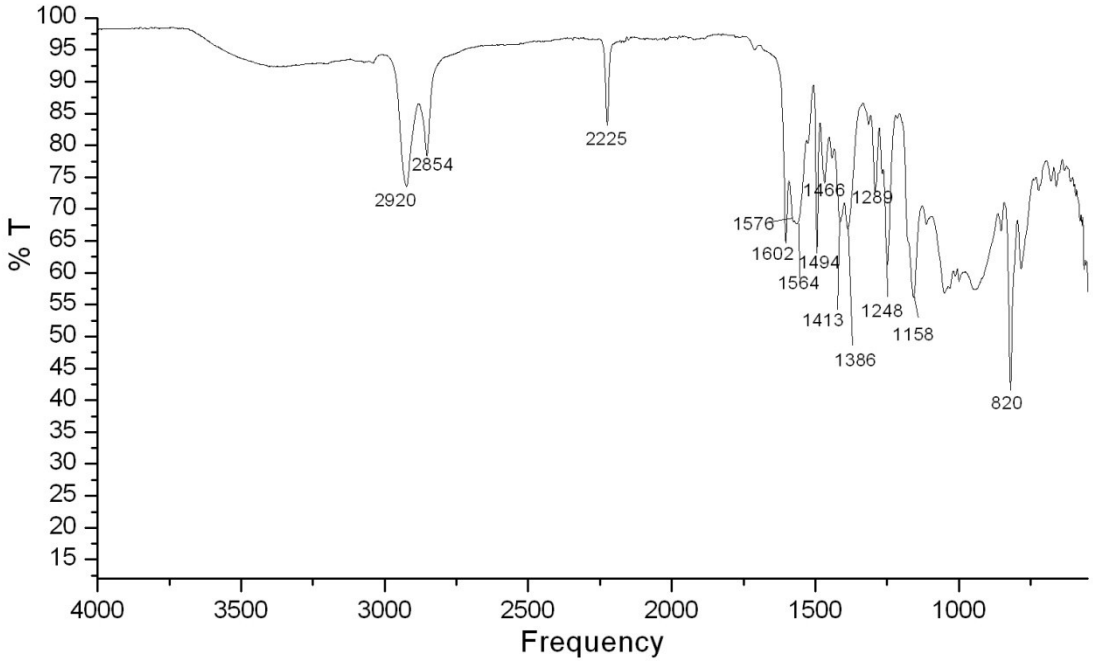


Figure S3. FTIR spectrum of ZnO-$_{Cya}$@SiO_2

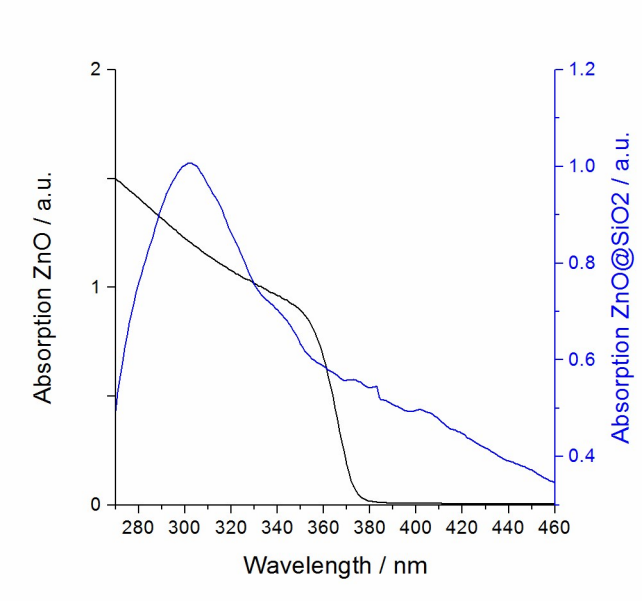


Figure S4. UV-Vis spectra of ZnO in and ZnO-Cya@SiO_2 in DMSO

1. M. Amela-Cortes, F. Dorson, M. Prévôt, A. Ghoufi, B. Fontaine, F. Goujon, R. Gautier, V. Cîrcu, C. Mériadec, F. Artzner, H. Folliot, S. Cordier and Y. Molard, *Chemistry – A European Journal*, 2014, **20**, 8561-8565.
2. S. Suarez, O. Mamula, R. Scopelliti, B. Donnio, D. Guillon, E. Terazzi, C. Piguet and J.-C. G. Bunzli, *New Journal of Chemistry*, 2005, **29**, 1323-1334.
3. S. Rakshit and S. Vasudevan, *The Journal of Physical Chemistry C*, 2008, **112**, 4531-4537.
4. C. Neaime, M. Prévôt, M. Amela-Cortes, V. Cîrcu, F. Grasset, H. Folliot and Y. Molard, *Chemistry – A European Journal*, 2014, **20**, 13770-13776.