Supporting Information

A small heterobifunctional ligand provides stable and water dispersible core-shell CdSe/ZnS quantum dots (QDs)

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Figure S19. (a) $^1$H-NMR spectrum (500 MHz, D$_2$O) of compound 13; (b) $^1$H-NMR spectrum (500 MHz, D$_2$O) of conjugated QDs 11.
**Figure S20.** (a) Electrophoresis analysis of the conjugation reaction with OVA protein; (b) Fluorescence spectrum of QDs 1-OVA conjugate.

**Figure S21.** Picture of PVA film (left) and PVA-QDs 1 composite (right).

**Figure S22.** SAXS pattern obtained for the PVA-QDs 1 composite. Blue markers represent the experimental data while the black solid line is the curve fitting (see main text for details).
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Figura S24. (a) $^1$H-NMR (500 MHz, D$_2$O) spectrum of compound 4. (b) $^{13}$C-NMR (125 MHz, D$_2$O) spectrum of compound 4.

**Synthesis of compound 13**

![Chemical structure]

To a solution of compound 4 (100 mg, 0.24 mmol) in DMF (0.5 mL), 1,1'-Carbonyldiimidazole (99 mg, 0.61 mmol) and Triethylamine (67 mg, 0.65 mmol) were added. The reaction mixture was stirred at r.t. for 30', then, a solution of 10 (160 mg, 0.61 mmol) in DMF (0.5 mL) was added. After 18 h at r.t., the reaction mixture was diluted with AcOEt (250 mL) and washed with
H$_2$O (3 x 15 mL) and BRINE (2 x 15 mL). Organic phase was dried over Na$_2$SO$_4$ filtered and reduced in vacuum. The crude was purified by flash column chromatography on silica gel (DCM:MeOH, 20:1) to give 13 as a yellow oil (82 mg, 56%). $^1$H-NMR (500 MHz, D$_2$O): δ 3.89-3.75 (m, 9H), 3.43-3.28 (m, 9H), 2.51-2.45 (m, 1H), 2.25 (t, $J = 5$ Hz, 2H), 1.94-1.88 (m, 1H), 1.78-1.62 (m, 4H), 1.53-1.44 (m, 2H). $^{13}$C-NMR (125 MHz, D$_2$O) 177.5, 170.7, 70.4, 70.2, 61.3, 58.8, 55.6, 54.0, 41.3, 4.6, 38.7, 36.2, 30.9, 21.6. ESI-MS m/z: calcd for [M + H$^+$]$^+$ 612.29. Found 613.37.

**S-Video**: Water dispersion of QDs 1 in NMR tube (3.0 mg/mL in D$_2$O) and lyophilization of QDs 1 is reported. Then the last section of the video shows QDs 1 as lyophilized powder and dispersion of QDs 1 (after 3 cycles of lyophilization) at the concentration of 13.0 mg/mL.