Electronic Supplementary Material (ESI) for RSC Advances


# Supplementary Information

## Determination of Energetics of Formation of Semiconductor/Dendrimer Nanohybrid Materials: Implications in Size and Size Distribution of Nanocrystals

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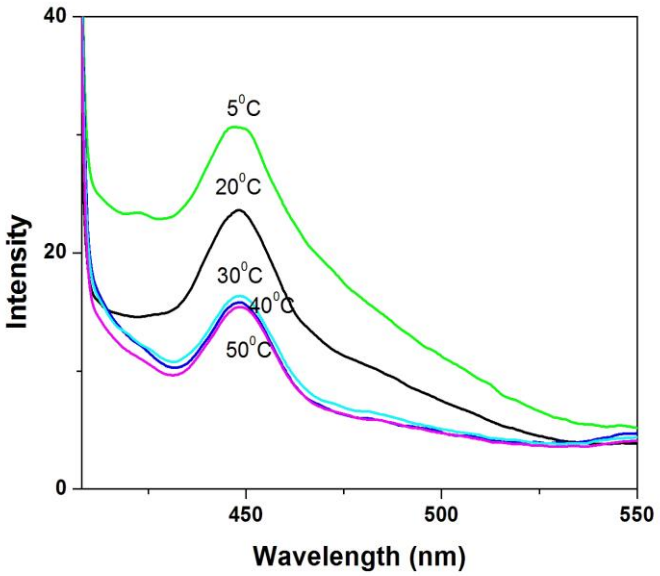


Figure S1. Luminescence spectra of CdS/dendrimer nanohybrids (collected from the reaction cell after completion of reaction) formed at different temperatures

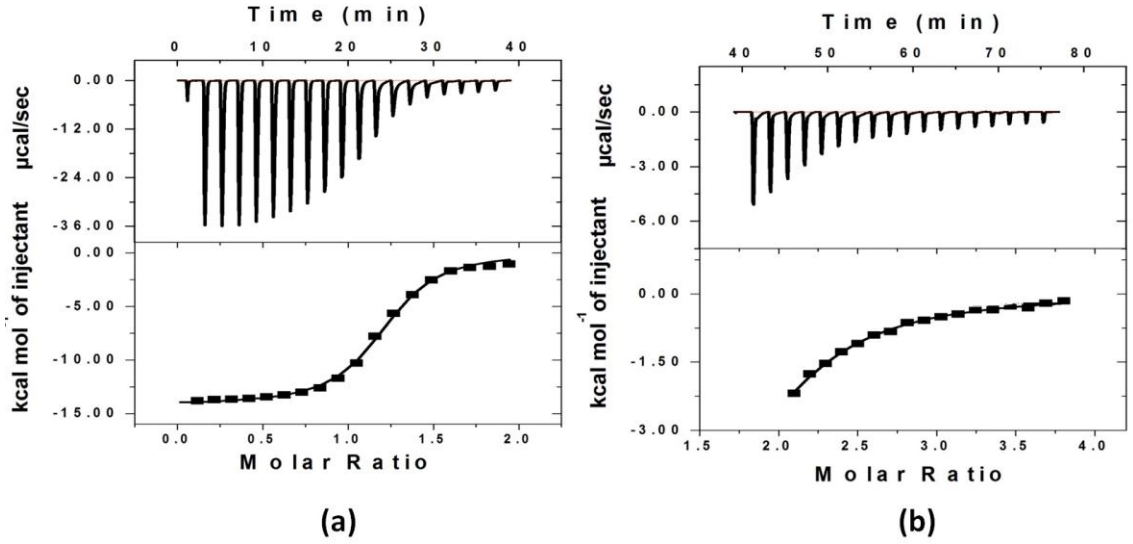


Figure S2. ITC thermogram for formation of CdS/Dendrimer nanohybrid with $Cd^{2+}$ : $S^{2-}$ = 1:20, (a) Phase I (b) Phase II

Table S1. Thermodynamic parameters for formation of ZnS/Dendrimer nanohybrid in phase I reaction at different temperatures

| Temp ($^0$C) | n | K ($M^{-1}$) | ΔH (kJ $mol^{-1}$) | ΔS (kJ $mol^{-1}$ $K^{-1}$) | ΔG (kJ $mol^{-1}$) | T ΔS (kJ $mol^{-1}$) |
|---|---|---|---|---|---|---|
| 5 | 1.40 | (1.85±0.08) ×$10^4$ | -75.2 ±1.5 | -0.19 | -23.0 | -52.2 |
| 10 | 1.42 | (1.66±0.07) ×$10^4$ | -74.3 ±1.1 | -0.18 | -22.8 | -51.5 |
| 20 | 1.48 | (1.48±0.12) ×$10^4$ | -63.8 ±1.4 | -0.14 | -23.3 | -40.5 |
| 30 | 1.52 | (6.67±0.25) ×$10^3$ | -33.2 ±1.7 | -0.04 | -22.3 | -10.9 |
| 40 | 1.57 | (5.49±0.38) ×$10^3$ | -31.2 ±1.6 | -0.02 | -24.2 | -6.9 |

Table S2. Thermodynamic parameters for formation of ZnS/Dendrimer nanohybrid in phase I reaction for different ratio of $Zn^{2+}$ : $S^{2-}$ ; (a) $Zn^{2+}$ : $S^{2-}$ = 1:10, (b) $Zn^{2+}$ : $S^{2-}$ = 1:20, (c) $Zn^{2+}$ : $S^{2-}$ = 1:30

| $Zn^{2+}$:$S^{2-}$ | n | K ($M^{-1}$) | ΔH (kJ $mol^{-1}$) | ΔS (kJ $mol^{-1}$ $K^{-1}$) | ΔG (kJ $mol^{-1}$) | T ΔS (kJ $mol^{-1}$) |
|---|---|---|---|---|---|---|
| 1:10 | 1.4 | (1.3±0.08) $\times 10^4$ | -(1.6±0.09) $\times 10^4$ | -0.16 | -21.9 | -45.4 |
| 1:20 | 1.2 | (1.0±0.06) $\times 10^4$ | -(2.0±0.08) $\times 10^4$ | -0.22 | -21.4 | -62.6 |
| 1:30 | 1.3 | (6.3±0.03) $\times 10^3$ | -(2.3±0.09) $\times 10^4$ | -0.27 | -20.3 | -76.2 |