

Supporting Information

**Huge enhancement of upconversion luminescence by broadband
dye sensitization of core/shell nanocrystals**

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Synthesis of core nanocrystals:

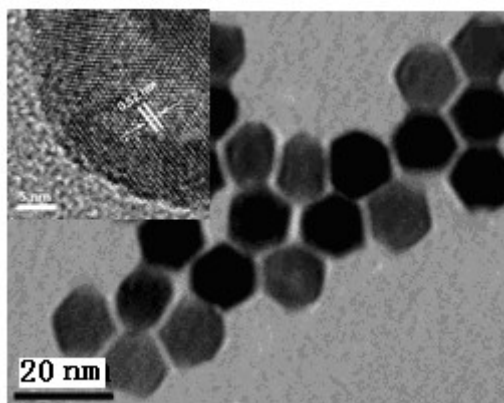


Fig. S1 The TEM and HRTEM (inset) images of the core nanocrystal: NaLuF₄:Gd,Yb,Er

Synthesis of IR-820:

¹H NMR (500 MHz, DMSO-*d*₆): δ 7.89 (2H, d, J = 8.5 Hz, Ar), 7.84 (2H, d, J = 13.5 Hz, Ar), 7.50 (4H, m, Ar), 7.39 (4H, m, Ar), 7.21 (2H, t, J = 7 Hz, -CH=CH-), 6.20 (2H, d, J = 14 Hz, =CH-CH=), 4.14 (4H, m, CH₂SO₃⁻), 3.04 (4H, m, -CH₂CH₂-), 1.79 (4H, m, -CH₂CH₂-), 1.71 (4H, m, -CH₂CH₂-), 1.38 (12H, s, CH₃).

MS: calculated for C₄₄H₄₉O₈S₃N₂: 829.25; found: 829.32.

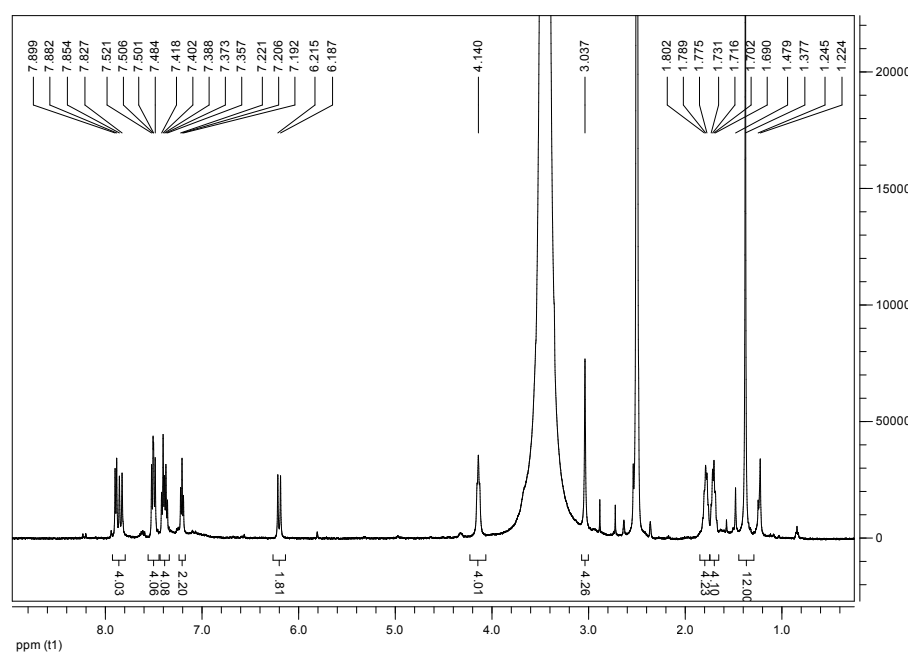


Fig. S2 ^1H -NMR (500 MHz, $(\text{CD}_3)_2\text{SO}$) spectrum of IR-820.

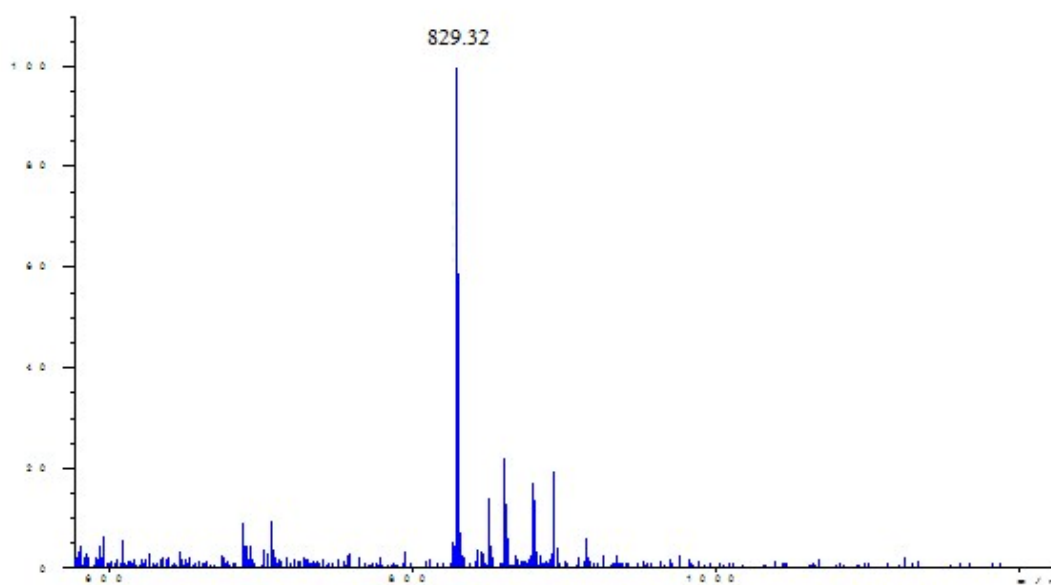


Fig. S3 ESI Mass spectrum of IR-820