

Supporting Information

A Theranostic System Based on NaY(Mn)F₄:Yb/Er Upconversion Nanoparticles with multi-drug resistance (MDR) reversing ability

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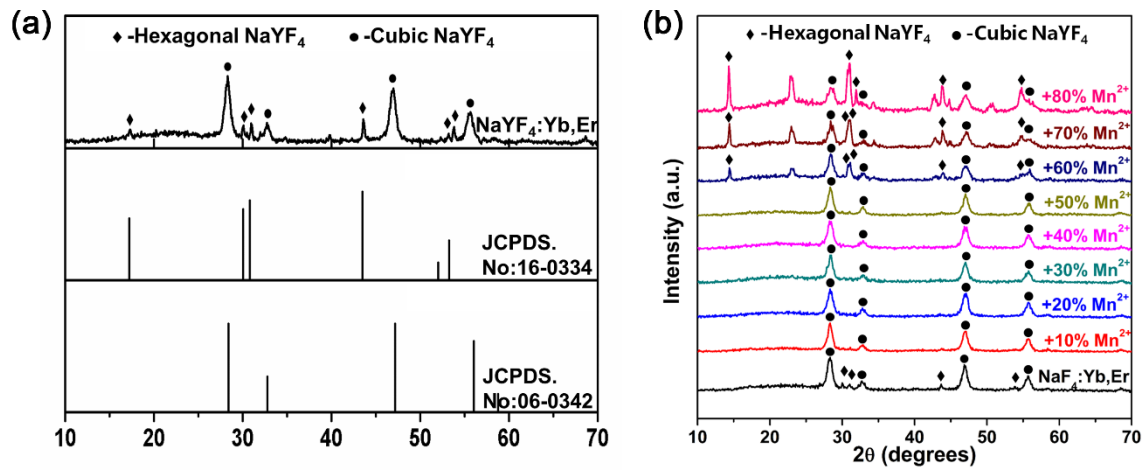


Figure S1. (a) XRD patterns of $\text{NaYF}_4:\text{Yb/Er}$ UN and the corresponding PDF cards. (b)

XRD patterns of $\text{NaY}(\text{Mn})\text{F}_4:\text{Yb/Er}$ UN with 0%-80% Mn^{2+} doping.

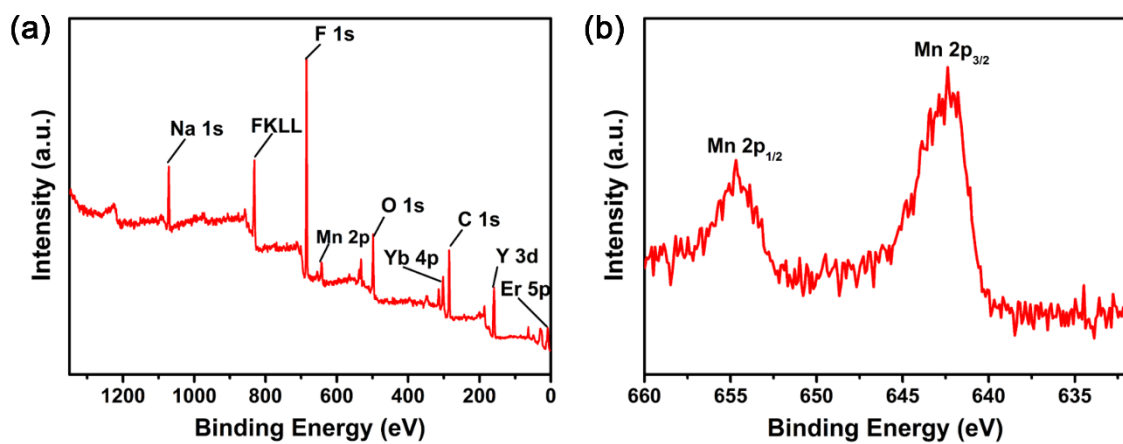


Figure S2. (a) XPS spectrum of NaY(Mn)F₄:Yb/Er UN with 50% Mn²⁺ doping. (b) High-resolution of XPS spectrum of Mn 2p. The Mn 2p_{1/2} and Mn 2p_{3/2} peaks located at 653.08 and 641.38 eV respectively.

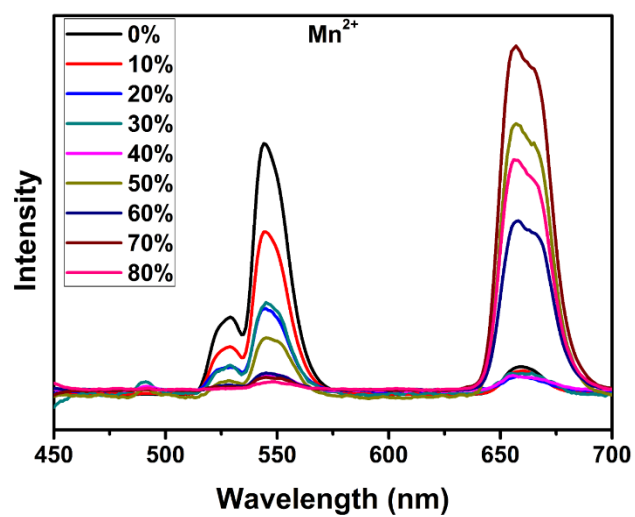


Figure S3. Upconversion emission spectra of NaY(Mn)F₄:Yb/Er nanocrystals with 0%-80% Mn²⁺ doping. (EX=980 nm).

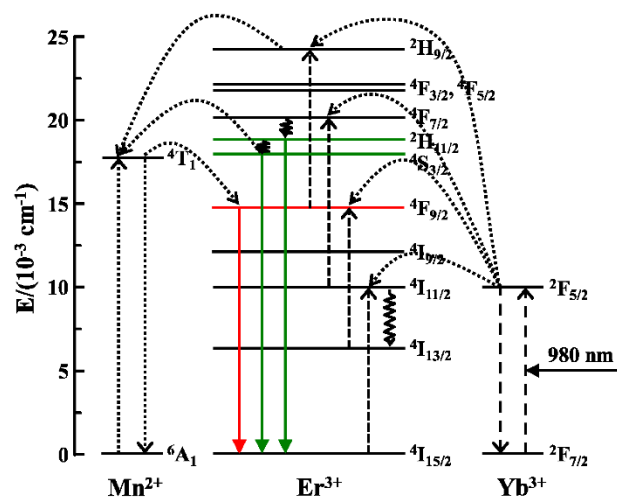


Figure S4. The simplified energy level diagram of Mn^{2+} -doped UN for the photon upconversion under NIR excitations .

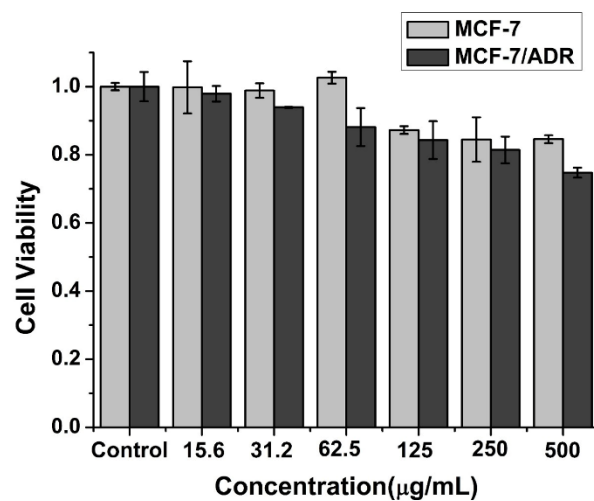


Figure S5. Cytotoxicity Evaluation: cell viabilities of MCF-7 and MCF-7/ADR after incubated with UNT for 24 h at different concentrations (0-500 µg/mL) respectively.

Table S1. Zeta potential values of the nanoparticles .

	UN	UNT	D-UNT
Zeta potential	21.6±0.51 mV	39.6±0.78 mV	40.8±1.1 mV