Experimental details

The nanorod structured β–$NaYF_4$: Yb^{3+}, Er^{3+} (2 wt% Er^{3+} and 20 wt% Yb^{3+} doped $NaYF_4$) used in the experiment was prepared by a facile hydrothermal approach. 0.7 g of NaOH, 8.0 mL of oleic acid, and 8.0 mL of ethanol were well mixed at room temperature to form a white viscous solution. Then 5.0 mL H_2O was poured into the above solution and 8.3 mL (4.80 mmol) of 0.58 mol L^{-1} NaF solution was added with vigorous stirring until a translucent solution was obtained. 1.1 mL (0.88 mmol) of 0.80 mol L^{-1} $Y(NO_3)_3$, 0.35 mL (0.22 mmol) of 0.63 mol L^{-1} $Yb(NO_3)_3$ and 0.05 mL (0.02 mmol) of 0.40 mol L^{-1} $Er(NO_3)_3$ were mixed. After aging for 10 min, the mixture was transferred to a 100 mL Teflon–lined autoclave, the samples were annealed at 230 ^oC for 12 h to obtain the final hexagonal phase samples. The resulting UCNPs were washed with ethanol, activated with 100 mL Trion X–100/H_2O (1: 4, v/v), after filtered and dried, the UCNPs were preserved in the desiccator. The synthesis of the UCNPs@MIP was carried out as follows: 0.165 g of metolcarb (1.0 mmol) was dissolved in 2.0 mL tetrahydrofuran (THF) and 2.0 mL toluene, then mixed with 0.340 mL (4.0 mmol) of methacrylic acid (MAA) after 0.250 g UCNPs were added. The mixture was stirred for 60 min before 0.760 mL (4.0 mmol) of cross–linker ethylene glycol dimethacrylate (EGDMA) and 0.02 g of initiator azodiisobutyronitrile (AIBN) were added. After stirring for another 30 min, the mixture was sealed and thermally initiated in a water bath at 60 ^oC for 20 h. After the polymerization, the template was removed by Soxhlet extraction with 300 mL of methanol/acetic acid (9: 1, v/v) until no analyte was detected using UV spectrometry at 210 nm. For comparison, the UCNPs@NIP was also prepared in the same way in the absence of a template.

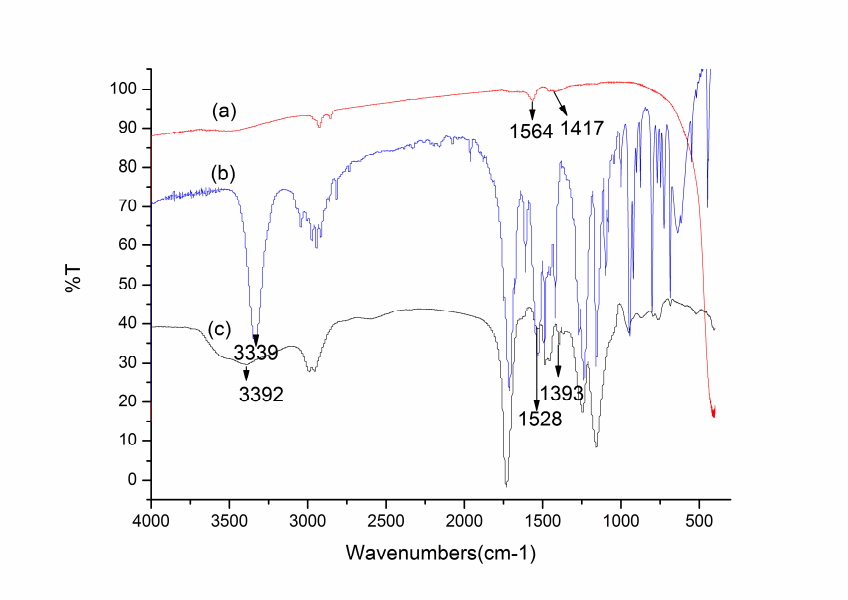

Fig. S1 FTIR spectrum of (a) UCNPs, (b) metolcarb and (c) UNCPs@MIP (the template not extracted).

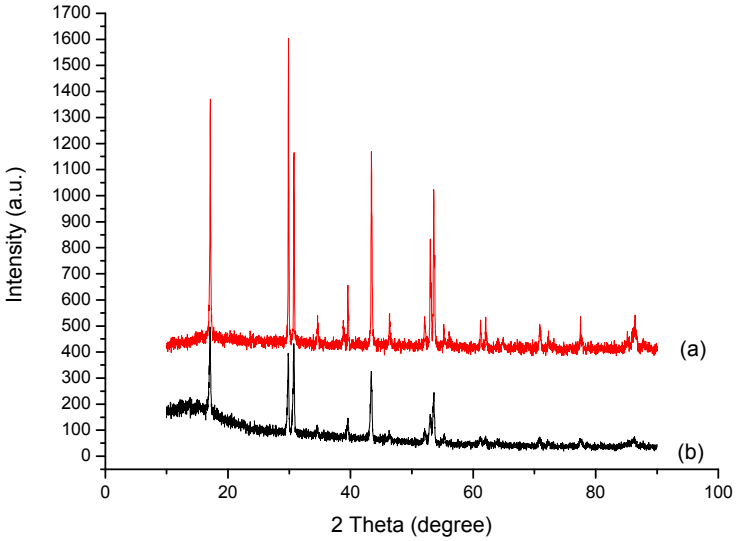

Fig. S2 Powder X–ray diffraction patterns for (a) UCNPs and (b) UCNPs@MIP.

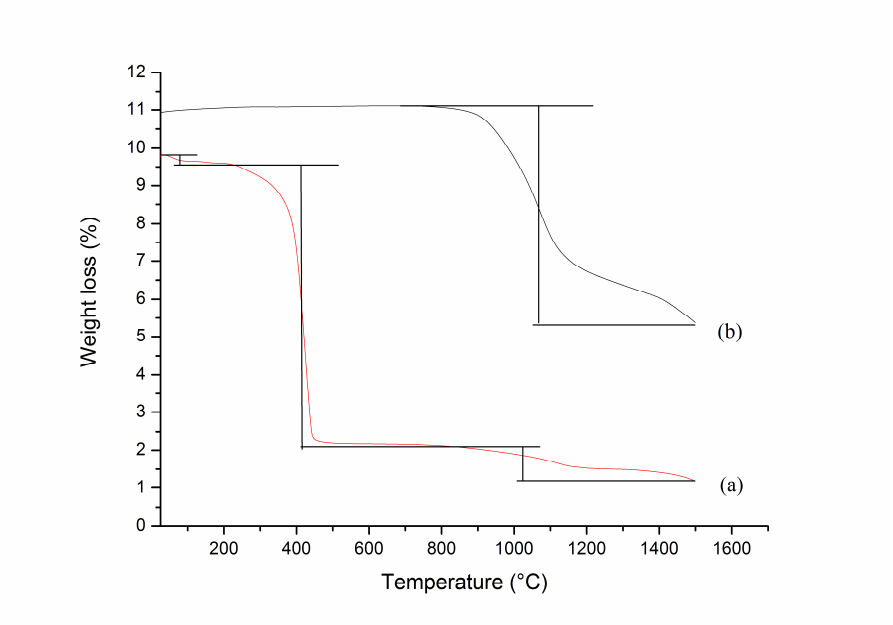

Fig. S3 Thermogravimetric analysis for (a) UCNPs and (b) UCNPs@MIP.

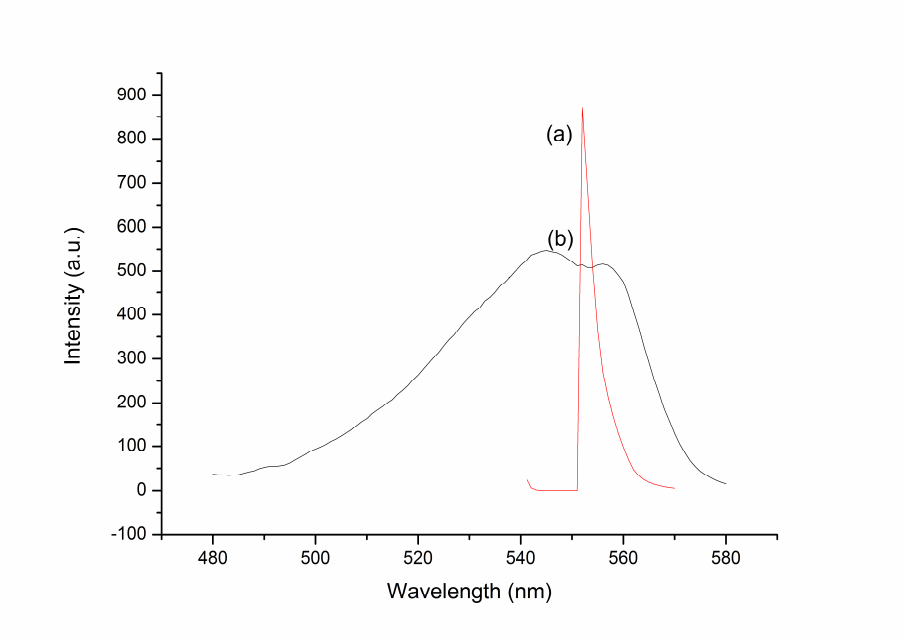

Fig.S4 Spectral overlap: (a) the absorbance spectrum of UCNPs@MIP and (b) the spectrum of metolcarb.

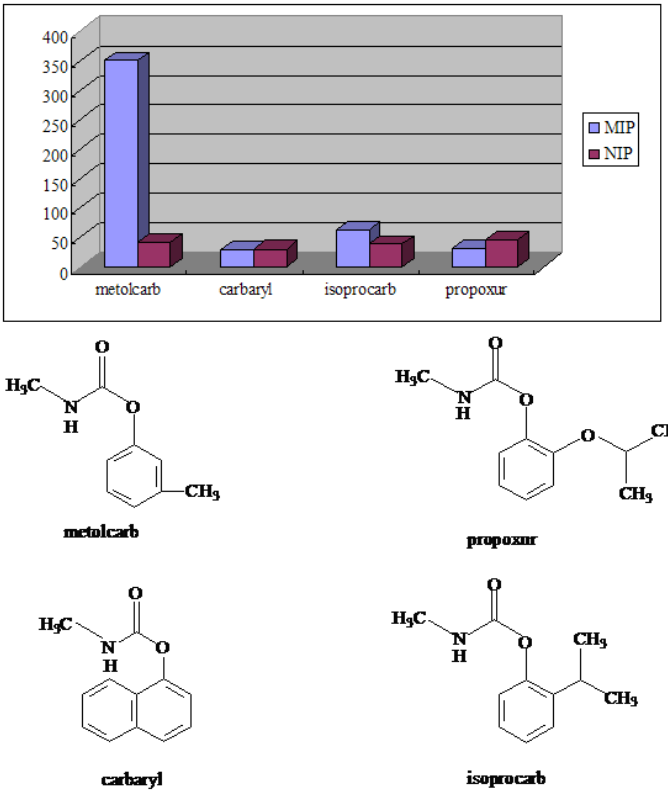

Fig.S5 Up: Selectivity of UCNPs@MIP and UCNPs@NIP toward metolcarb in individual metolcarb, propoxur, carbaryl and isoprocarb aqueous solution at a concentration of 1.0 μg mL^{-1}. Bottom: The structures of metolcarb, propoxur, carbaryl and isoprocarb.