## **Supporting Information for**

## PEGylation of fluoridated hydroxyapatite (FAp):Ln<sup>3+</sup> nanorods for cell imaging

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**Scheme S1** Synthesis of diblock polymers poly(PEGMA-SMA) via RAFT polymerization using monomers PEGMA and SMA with different molar ratios (PEGMA/SMA = 3:7 for PEG-3 and PEGMA/SMA = 7:3 for PEG-7).



**Fig. S1** TEM images of PEG coated FAp:10% Eu<sup>3+</sup> nanorods dispersed in water, (A) FAp: 10% Eu<sup>3+</sup> -PEG-3, (B) FAp:10% Eu<sup>3+</sup> -PEG-7.



**Fig. S2** TGA cruves of FAp:  $10\% \text{ Eu}^{3+}$  and FAp:  $10\% \text{ Eu}^{3+}$  -PEG-3.



**Fig. S3** Photograph of FAp:  $10\% \text{ Eu}^{3+}$  -PEG-3 (left bottle) and FAp:  $10\% \text{ Eu}^{3+}$  -PEG-7 (right bottle) dispersed in pure water for 24 h (A) and 48 h (B).



**Fig. S**4 Optical microscopy images of A549 cells incubated with different concentrations of FAp:  $Tb^{3+}$ -PEG-3 nanorods for 24 h, (A) control cells, (B) 40 µg mL<sup>-1</sup>, (C) 80 µg mL<sup>-1</sup>; (D) 160 µg mL<sup>-1</sup>.