SUPPORTING INFORMATION

Integrating Anatomic and Functional Dual-Mode Magnetic Resonance Imaging: Design and Applicability of a Bifunctional Contrast Agent

Dalong Ni,[†,#] *Zhiwei Shen,*[‡,#] *Jiawen Zhang,*[§] *Chen Zhang,*[†] *Renhua Wu,*[‡] *Jianan Liu,*[†] *Meizhi Yi,*[‡] *Jing Wang,*[§] *Zhenwei Yao,*[§] *Wenbo Bu,*[†,//,*] *and Jianlin Shi*[†]

[†]State Key Laboratory of High Performance Ceramics and Superfine Microstructures, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, 200050, China

[‡]Department of Radiology, 2nd Affiliated Hospital, Shantou University Medical College, Shantou, 515065, China

[§]Department of Radiology, Huashan Hospital, Fudan University, Shanghai, 200040, China

[//]Shanghai Key Laboratory of Green Chemistry and Chemical Processes, School of Chemistry and Molecular Engineering, East China Normal University, Shanghai, 200062, China

#D. N. and Z. S. contributed equally to this work.

* Email addresses: wbbu@mail.sic.ac.cn

Keywords: MRI, CEST, pH probe, contrast agents, glioblastoma

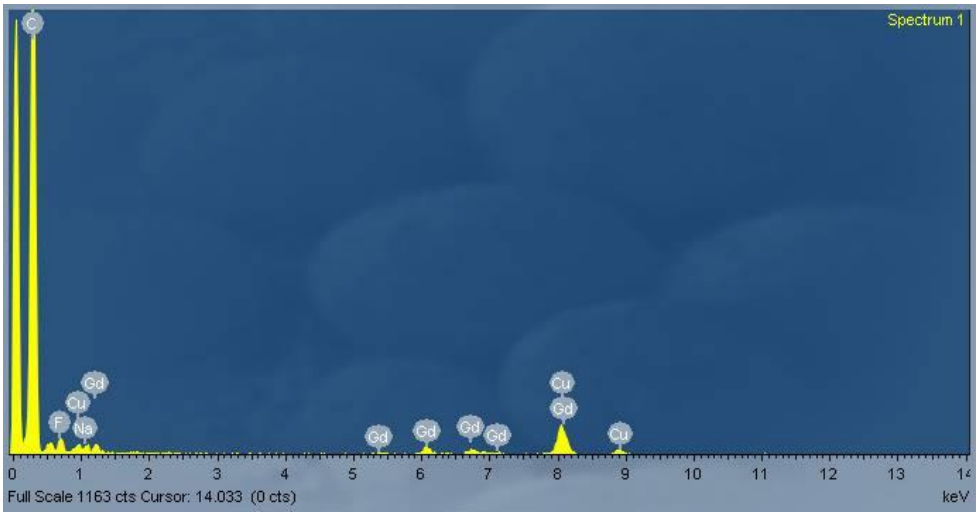

Figure S1.The EDX spectrum of $NaGdF_4$ nanodots.

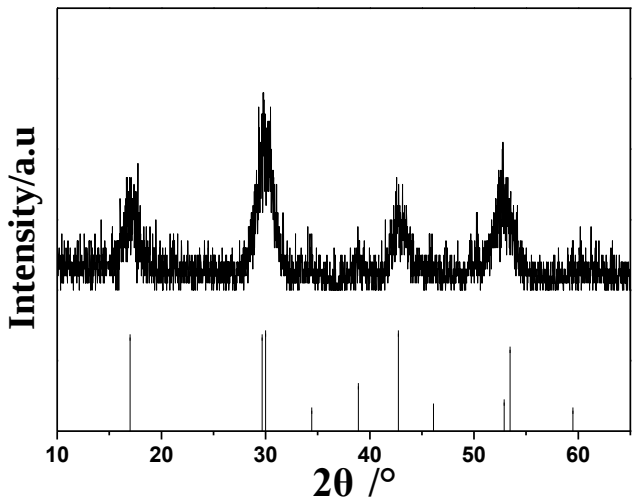

Figure S2. X-ray powder diffraction (XRD) pattern of $NaGdF_4$ NDs and the standard pattern of $NaGdF_4$ (JCPDS.NO.27-0699)

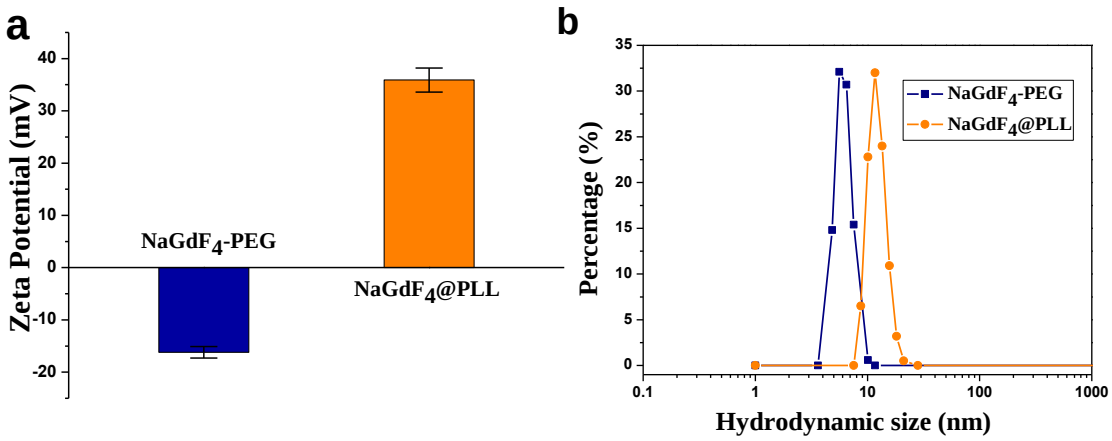

Figure S3. Zeta-potentials (a) and dynamic light scattering (DLS) sizes (b) of $NaGdF_4$-PEG and $NaGdF_4$@PLL NDs.

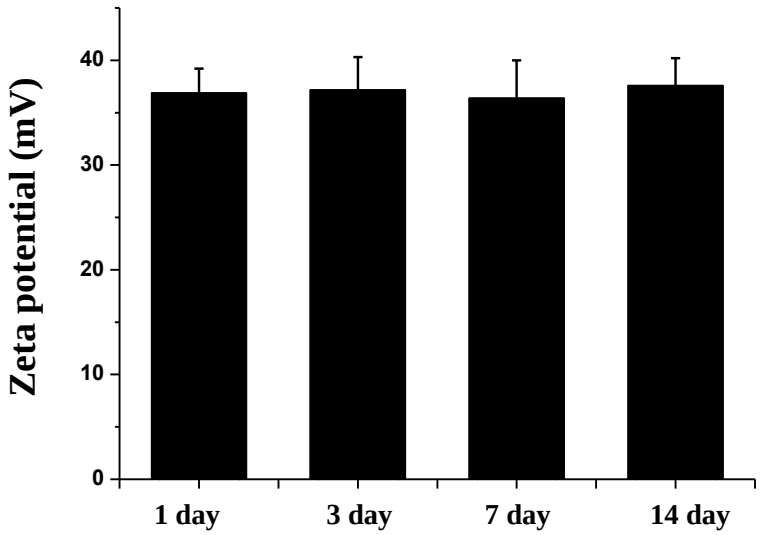

Figure S4 The Zeta potential variation of $NaGdF_4$@PLL NDs in two weeks.

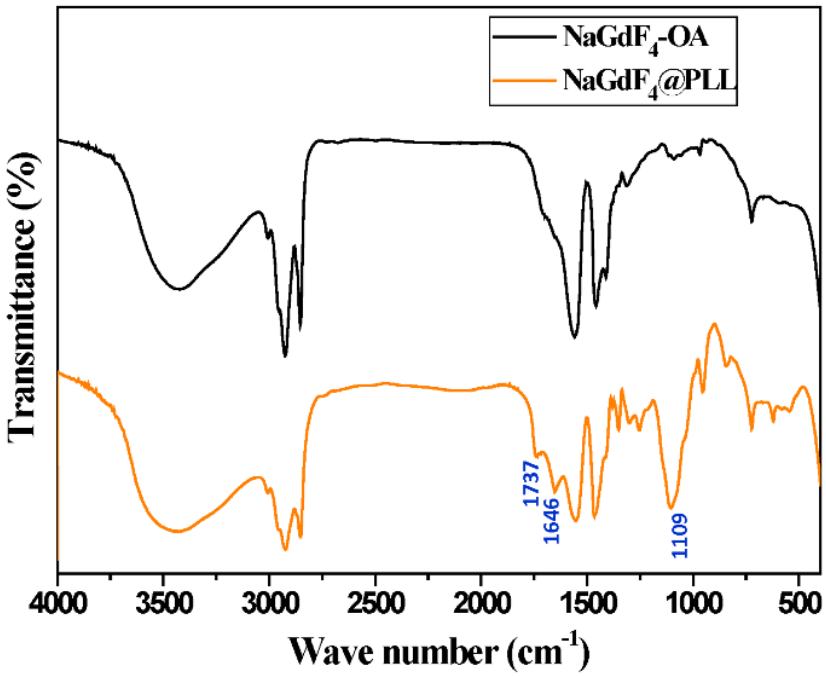

Figure S5. Fourier transform infrared (FT-IR) spectra of $NaGdF_4$-OA and $NaGdF_4$@PLL NDs.

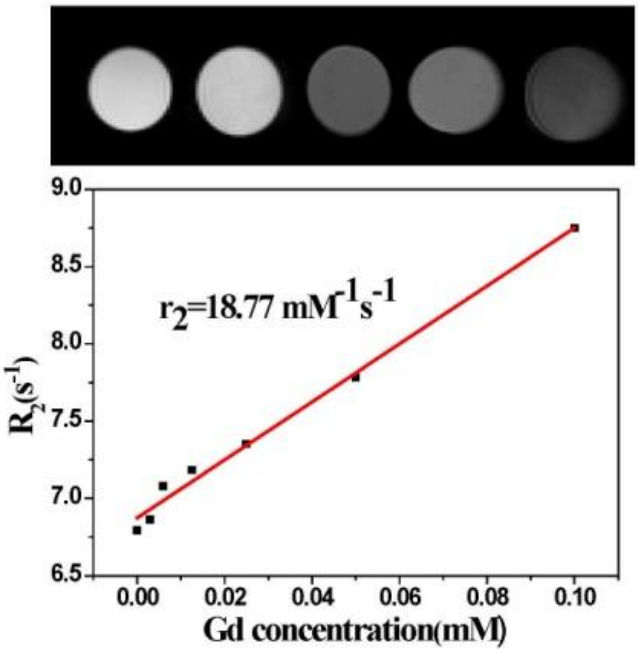

Figure S6. The Gd^{3+} concentration-dependent T_2 relaxation rates of $NaGdF_4$@PLL NDs. Upper: T_2-weighted MR images of $NaGdF_4$@PLL NDs of various Gd^{3+} concentrations.

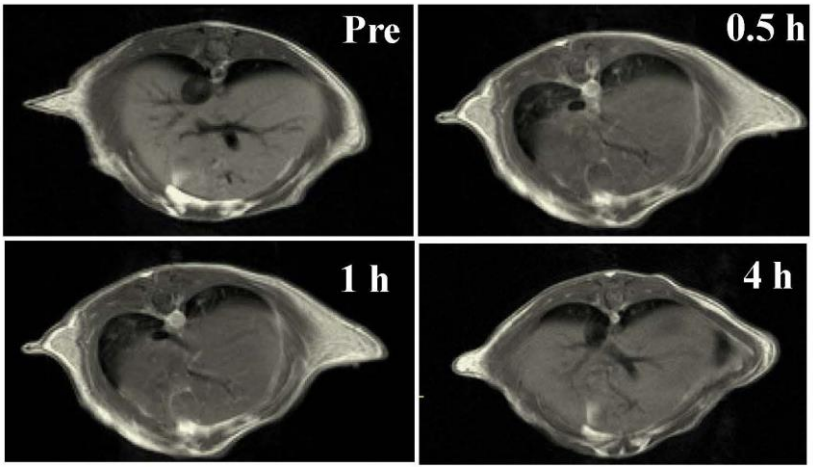

Figure S7. *In vivo* T_1-weighted MR images of mouse's liver before and after the intravenous administration of $NaGdF_4$@PLL NDs.

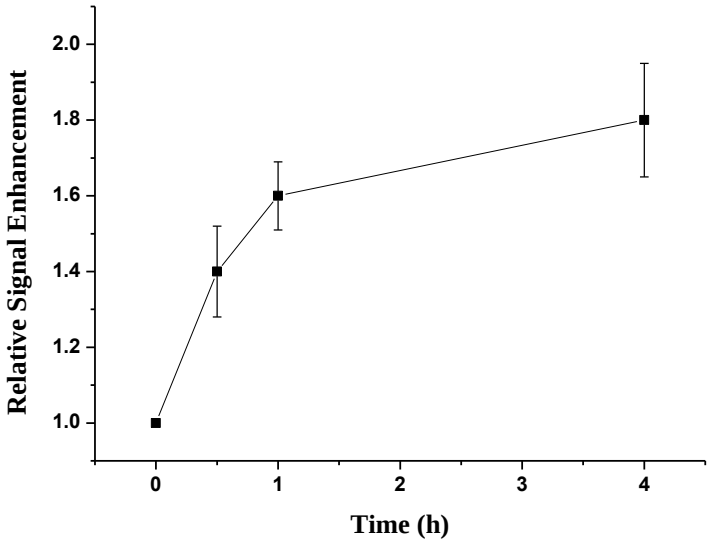

Figure S8. Quantitative analysis results of signal intensity of kidney in the T_1-weighted MR images.

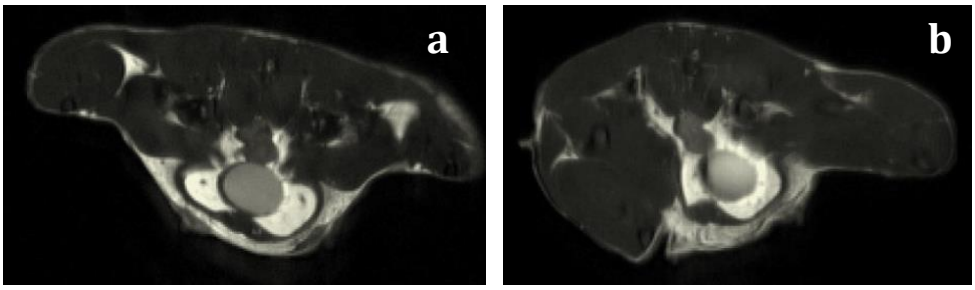

Figure S9. *In vivo* T_1-weighted MR images of mouse‘s bladder before (a) and 4 h (b) after injection with the $NaGdF_4$@PLL NDs

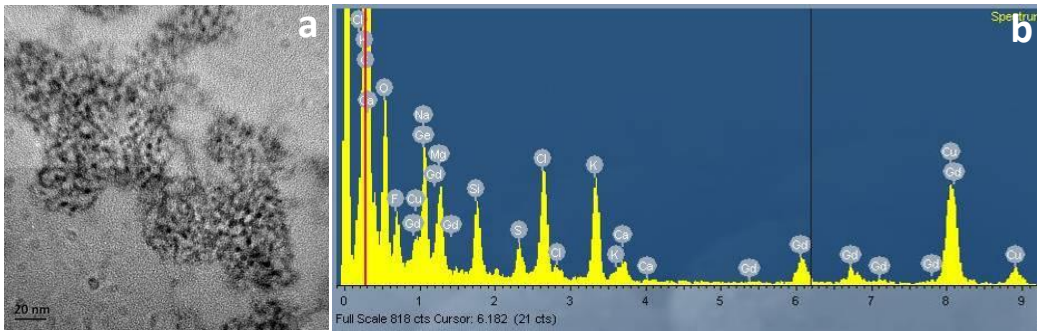

Figure S10. (a) TEM image and EDX spectrum of mouse's urine after intravenous injection with the $NaGdF_4$@PLL NDs.