## **Electronic Supplementary Information**

Surface Morphology and Payload Synergistically Caused

Enhancement of Longitudinal Relaxivity for Mn<sub>3</sub>O<sub>4</sub>/PtO<sub>x</sub>

## Nanocomposite in Magnetic Resonance Tumor Imaging

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**Table S1.** The volume of adding  $Na_2PtCl_4$  and the corresponding molar ratio of different  $Pt@Mn_3O_4 NPs$ 

Different Pt@Mn <sub>3</sub> O <sub>4</sub> NPs							
Na <sub>2</sub> PtCl <sub>4</sub> solution (mL)	0.5	0.6	0.8	1.0	1.1	1.15	1.2
Actual Pt/Mn molar ratio	0.4	0.6	0.7	1.1	1.6	2.2	2.6



Figure S1. XRD patterns of the sample (a)  $MnO_x$  NPs generated by LAL; (b)  $Mn_3O_4$  NPs after LIL.



**Figure S2.** STEM HAADF of Mn<sub>3</sub>O<sub>4</sub>/PtO<sub>x</sub> NCs.



**Figure S3.** The XPS spectra of O element of different samples: (a) $Mn_3O_4$ ; (b) sample 1; (c) sample 2; (d) sample 3 and (e) sample 4. The XPS spectra of Mn element of different samples: (f)  $Mn_3O_4$ ; (g) sample 1; (h) sample 2; (i) sample 3 and (j) sample 4. (black line: raw data, red line: fitting data)



Figure S4. The FTIR spectra of the  $Mn_3O_4/PtO_x$  NCs before and after PEGylation.



**Figure S5.** Size distribution of  $Mn_3O_4/PtO_x$  NCs.



Figure S6. T<sub>1</sub>-weight image of Na<sub>2</sub>PtCl<sub>4</sub> and PtO<sub>2</sub> with different Pt concentration.



**Figure S7.** (a) TEM image of Pt@Mn<sub>3</sub>O<sub>4</sub>; (b) STEM image of Pt@Mn<sub>3</sub>O<sub>4</sub>; (c) EDS mapping of Pt@Mn<sub>3</sub>O<sub>4</sub> NCs: (c) overlapping image; (d)Mn; (e) O; (f) Pt.



Figure S8. XRD pattern of the Pt@Mn<sub>3</sub>O<sub>4</sub> NPs.



**Figure S9.** TEM image and the corresponding size distribution of  $Pt@Mn_3O_4$  NPs with different molar ratio: (a) & (d) 0.4; (b) & (e) 0.7; (c) & (f) 2.2.