

## Supplementary data

### Silica-F127 Nanohybrid-encapsulated Manganese Oxide Nanoparticles for Optimized T1 Magnetic Resonance Relaxivity

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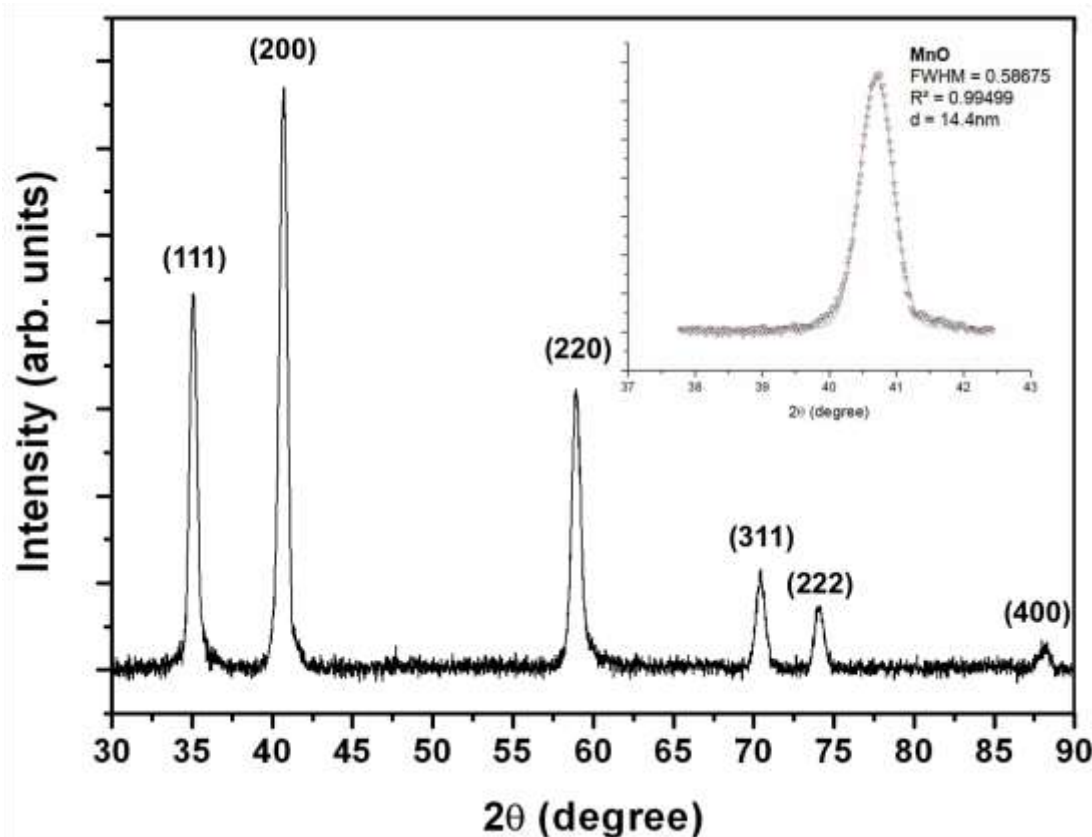
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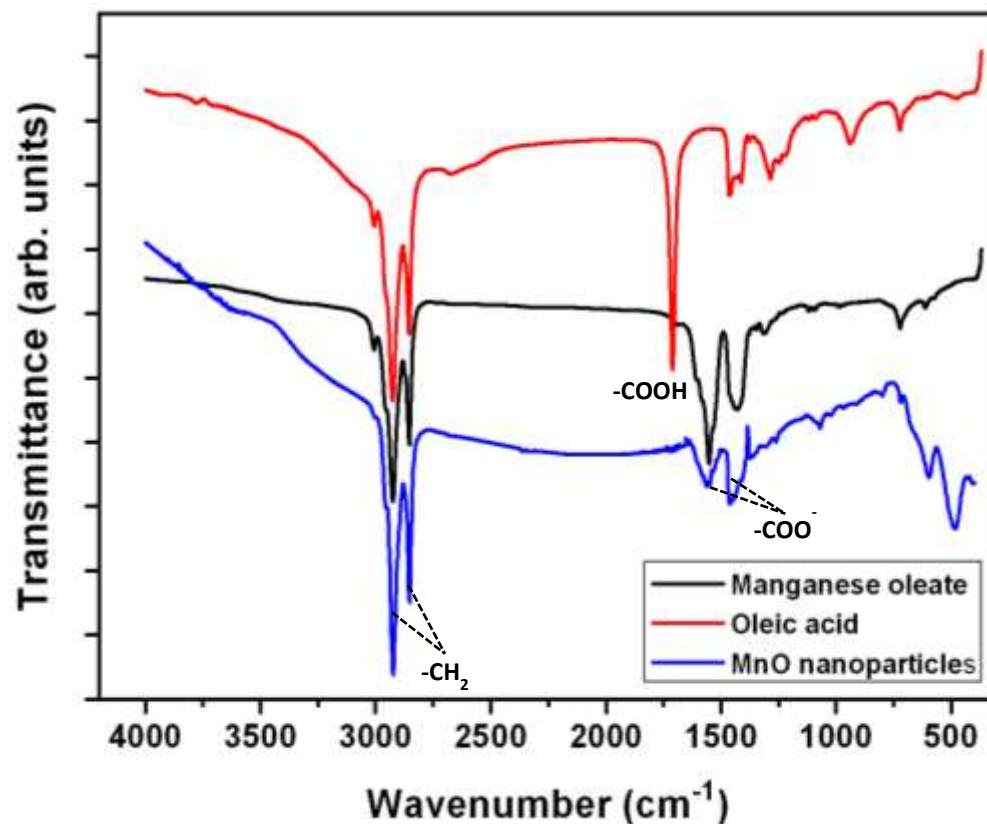
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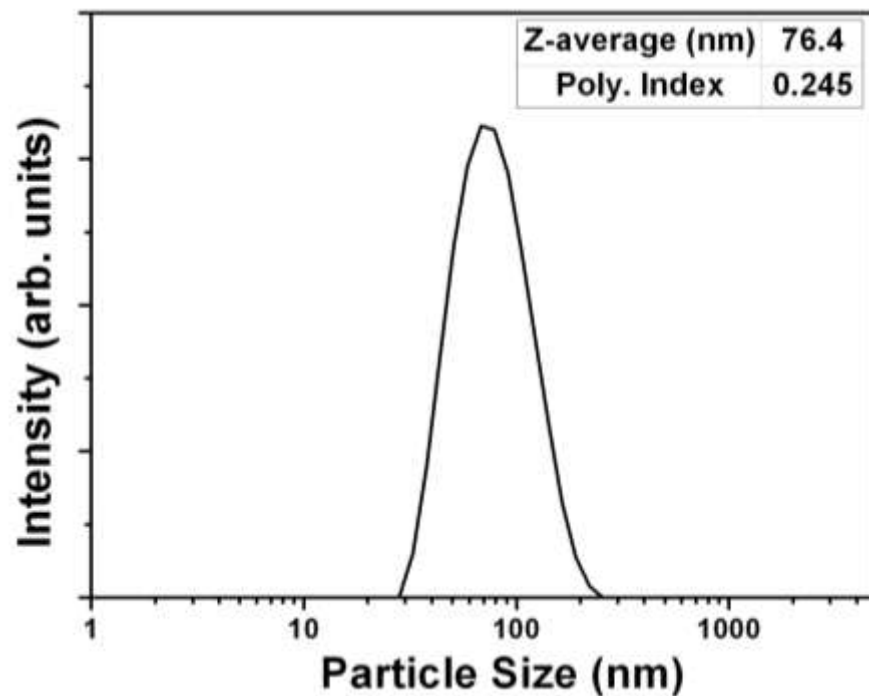
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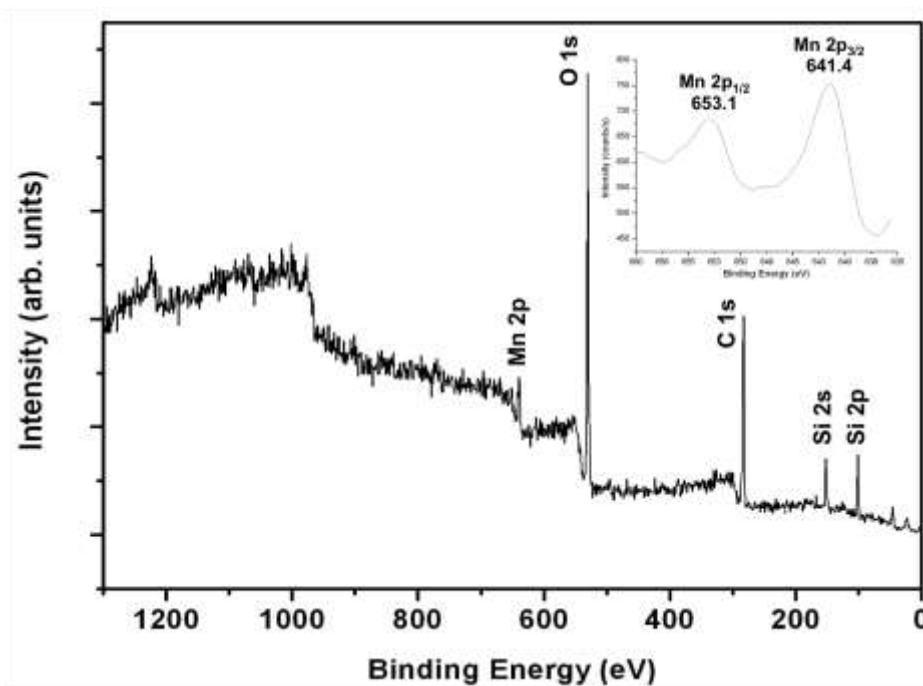
**Fig. S1** X-ray diffraction trace of MnO nanoparticles (MONPs). The average crystallite size of MONPs ( $d = 14.4\text{nm}$ ) is calculated using the Debye-Scherrer formula.



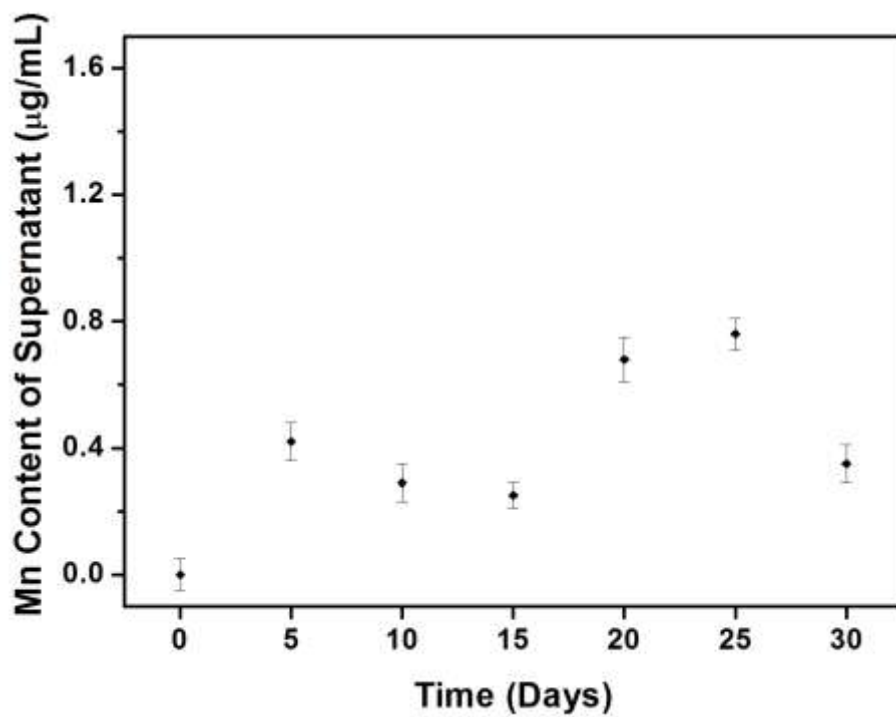
**Fig. S2** Figure S2: FT-IR spectra of oleic acid, manganese oleate and the as-synthesized MONPs. The four characteristic bands of oleyl group  $-\text{OOC}-(\text{CH}_2)_7-\text{CH}=\text{CH}-(\text{CH}_2)_7-\text{CH}_3$  are observed. While the bands at  $1555\text{ cm}^{-1}$  and  $1410\text{ cm}^{-1}$  can be assigned to the asymmetric and symmetric stretching modes of the carboxylate group, the bands at  $2925\text{ cm}^{-1}$  and  $2854\text{ cm}^{-1}$  are due to the symmetric and asymmetric stretching of the  $\text{CH}_2$  bond.



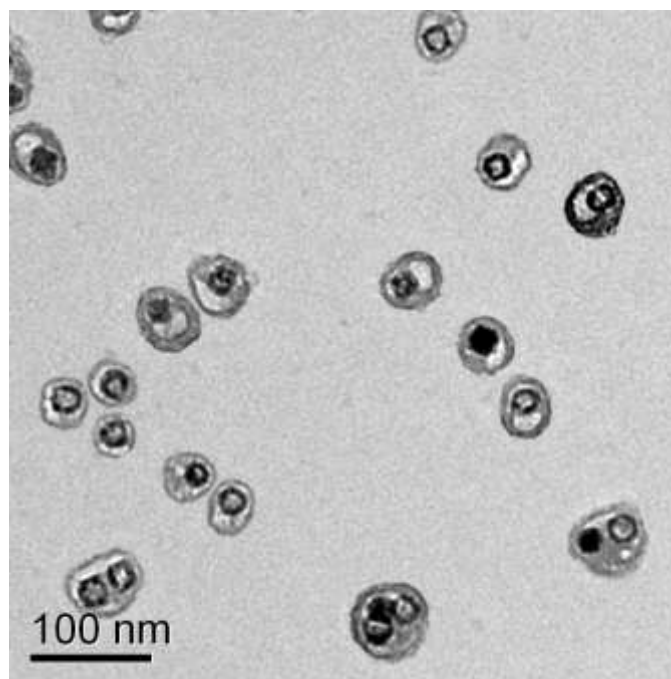
**Fig. S3** Hydrodynamic size distribution of PEO/SiO<sub>2</sub>-encapsulated MONPs (PEOMSN), measured by dynamic light scattering (DLS). The average hydrodynamic diameter was determined to be 76.4 nm.



**Fig. S4** Wide-scan XPS spectrum of the as-prepared PEOMSN. The inset shows a high-resolution XPS scans of the Mn 2p region.



**Fig. S5** Mn-ion leaching experiments. The increase in Mn content of the supernatant of PEOMSN was determined over time.



**Fig. S6** TEM images of PEOMSN after 16-hour acidic etch in an acetate buffer solution. Formation of hollow cavities within the encapsulated MONPs is observed.