

SUPPORTING INFORMATION

Development of hybrid nanomaterials based on MXene/Fe₃O₄ magnetic nanoparticles for photo-magnetic hyperthermia applications

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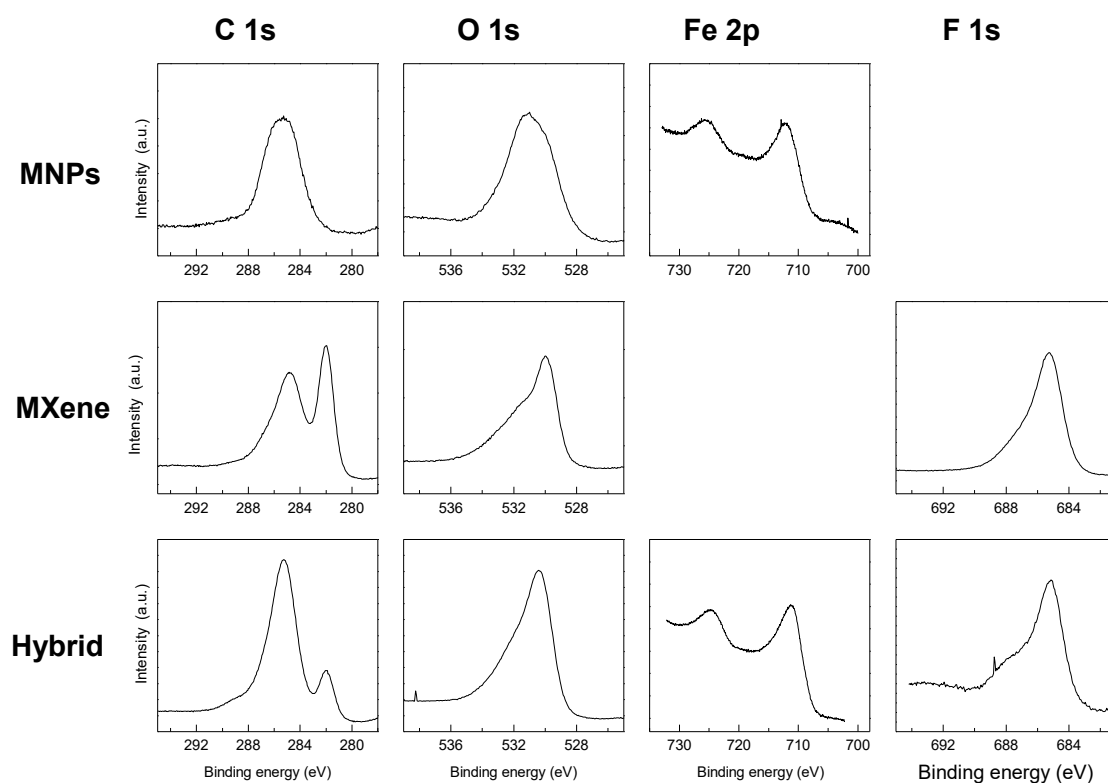


Fig. S1. High resolution C 1s, O 1s, F 1s and Fe 2p XPS regions of Fe_3O_4 (upper line), dMXene (central line) and $\text{Ti}_3\text{C}_2\text{T}_x/\text{Fe}_3\text{O}_4$ 50:50 hybrid nanomaterial (bottom line).

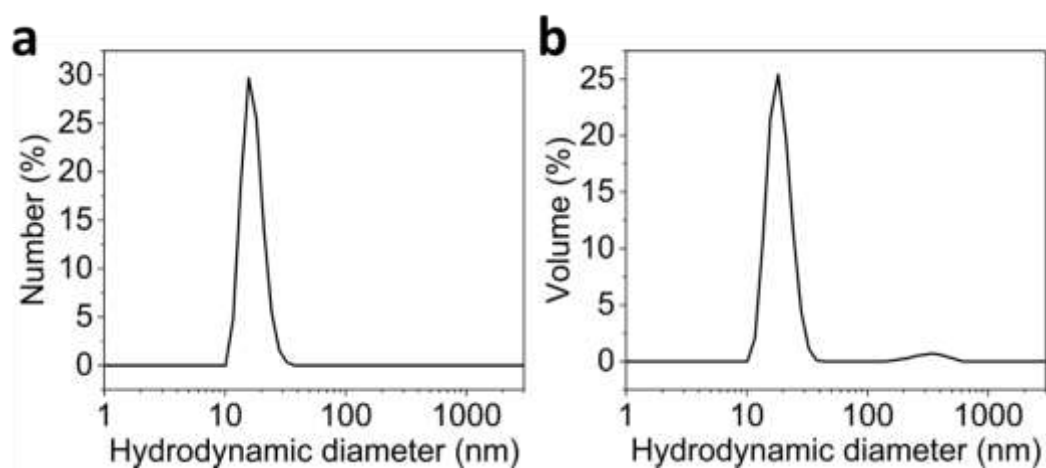


Fig. S2. Size distributions in term of (a) number and (b) volume of IONPs in THF.

Table S1. Colloidal stability characterization through Dynamic Light Scattering (DLS): Solvent, size distributions in term of Number, Volume and Intensity of IONPs, Z-average (Z-ave) and Polidispersity Index (PDI).

MNPs	Solvent	Number (nm)	Volume (nm)	Intensity (nm)	Z-ave (nm)	PDI
IONPs	THF	17±3	30±3	197±58	102.60	0.377

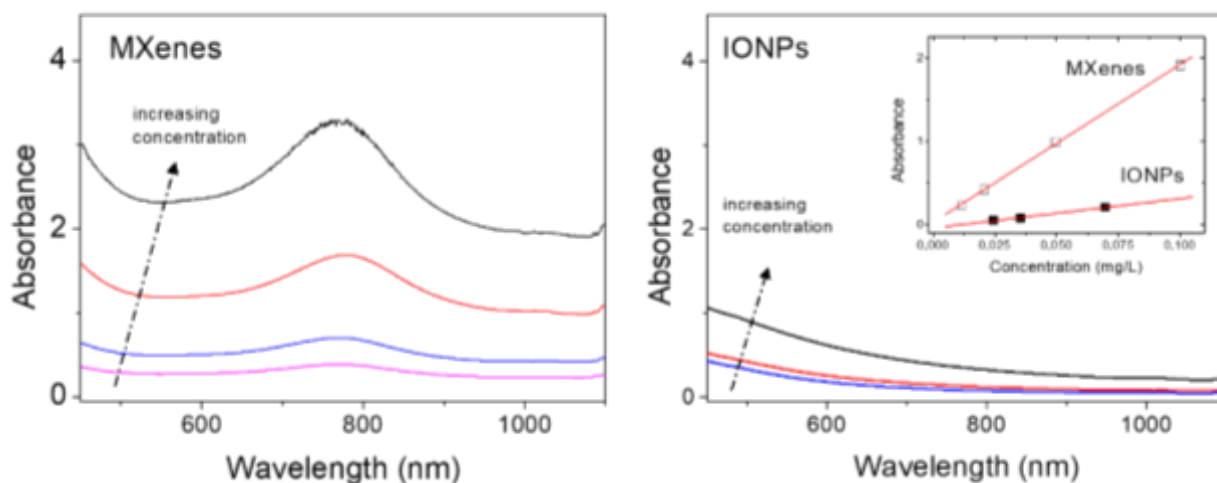


Fig. S3. VIS-NIR spectra of bare MXenes (left) and bare IONPs (right) in water at different concentrations. Insert shows the absorbance vs concentration (mg/L) fit.

Concentration

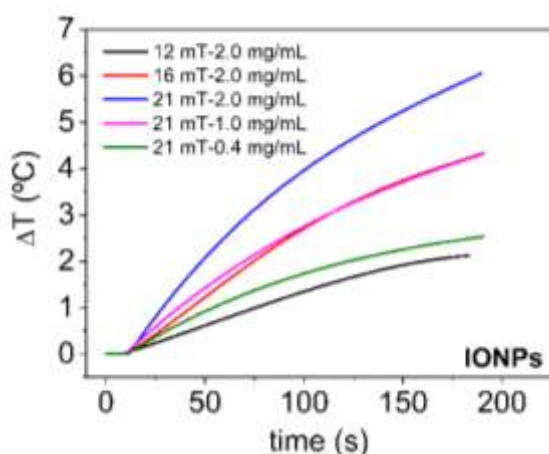


Fig. S4. Magnetic hyperthermia curves of bare magnetic nanoparticles at different concentrations (2.0, 1.0 and 0.4 mg/mL) and different applied fields (9, 13 and 17 kA/m) at a constant frequency of 282 kHz.

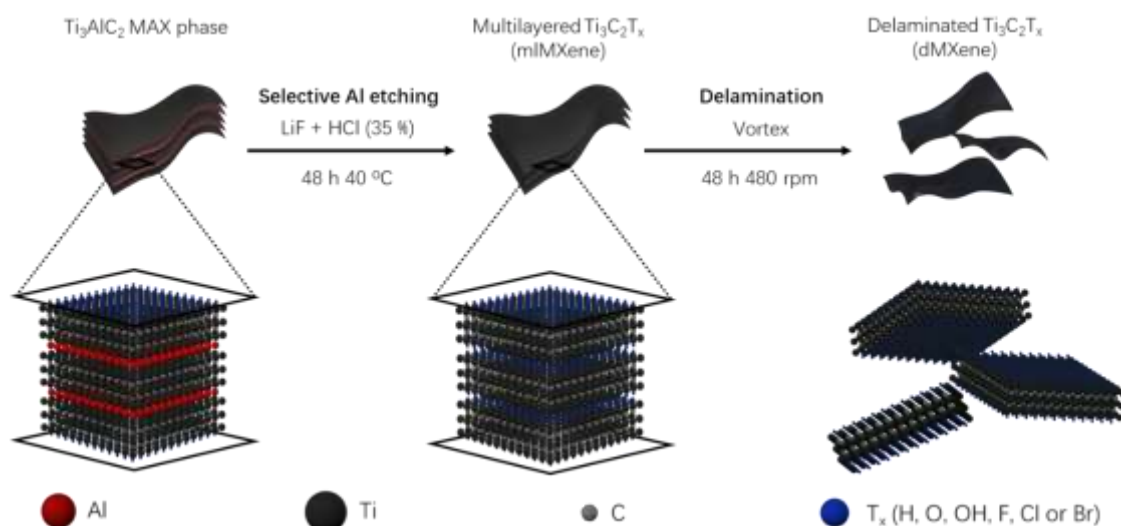


Fig. S5. Schematic of the synthetic route followed to obtain delaminated $\text{Ti}_3\text{C}_2\text{T}_x$ -type MXenes from the corresponding Ti_3AlC_2 MAX phase, together with their atomic structures.

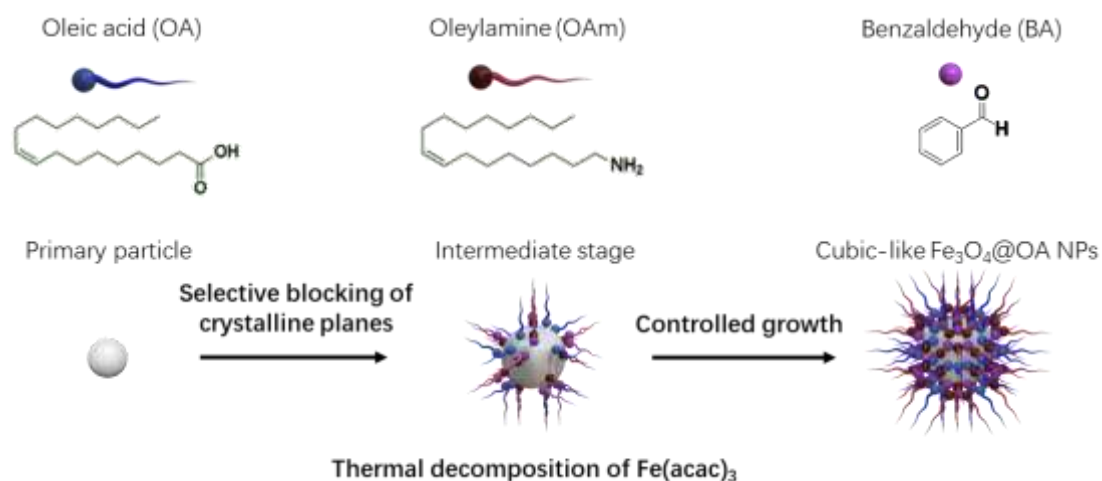


Fig. S6. Scheme of the synthetic route followed to obtain monodisperse magnetite nanoparticles with organic coating composed of oleic acid (OA), oleylamine (OAm) and benzaldehyde (BA) by the thermal decomposition method of the precursor $\text{Fe}(\text{acac})_3$.