

Supplementary Materials

Synergistical Use of Electrostatic and Hydrophobic Interactions for the Synthesis of a New Class of Multifunctional Nanohybrids: Plasmonic Magneto-Liposomes

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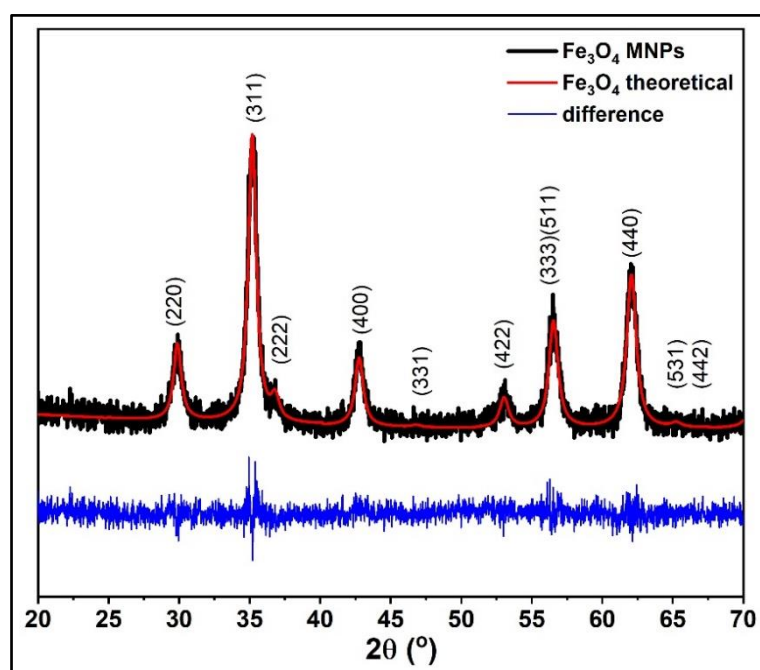


Figure S1. X-ray diffractogram acquired on SPIONs powder.

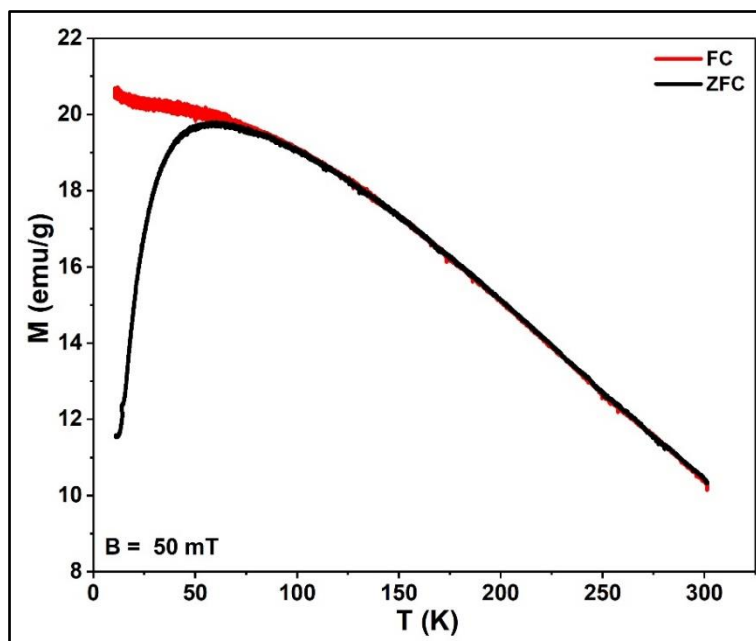


Figure S2. Zero Field Cooling and Field Cooling curves acquired on Fe_3O_4 spherical magnetic nanoparticles.

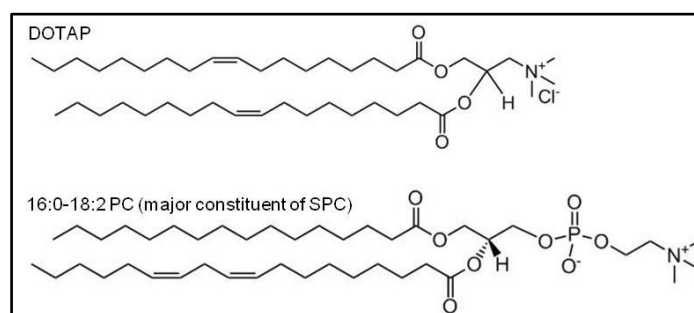


Figure S3. Chemical structures of DOTAP and of soybean phosphatidylcholine (SPC) lipids.



Figure S4. Optical image of 5 batches of liposomal dispersions ordered from left to right with respect to the volume of SPIONs dispersion used in the synthesis: 1. 0 μL (bare liposomes) 2. 10 μL 3. 50 μL 4. 250 μL 5. 1000 μL .

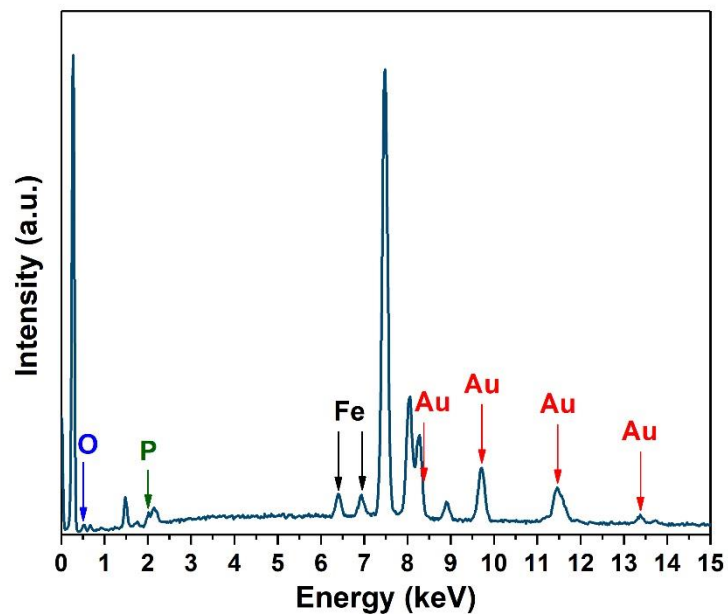


Figure S5. Energy Dispersive Spectroscopy (EDS) analysis of MLP250 sample.

Table S1. Zeta potential of nanoobjects.

Sample	Dilution	pH	ζ (mV)
AuPEG	1:16	10.1	-29.6
Lipo 0 μL	1:4	3.56	+59.7
Lipo 10 μL	1:4	3.45	+43.9
Lipo 50 μL	1:4	3.53	+43.4
Lipo 250 μL	1:4	3.99	+47.9
Lipo1000 μL	1:4	3.24	+51.1

Table S2. PCS measurements results for the liposomal dispersions.

Liposome batch	Dilution	PDI	Hydrodynamic diameter (nm)	
			Peak ₁	Peak ₂
Simple (0 μL)	-	0.295	180.9	31.27
10 μL	-	0.431	179.8	36.31
50 μL	-	0.342	227.5	33.55
250 μL	1:4	0.460	393.9	71.60
1000 μL	1:16	0.302	389.2	93.35

PDI = polydispersity index

Table S3. Assignment of the major vibrational bands recorded on cationic liposomes.

Wavenumber (cm ⁻¹)	Assignment
718	symmetric stretch vibration of the C-N bonds from the N ⁺ (CH ₃) ₃ choline group
765	stretching vibration of the quaternary ammonium group & stretching vibration of the esterified P-O bonds from the phosphate groups
850	Asymmetric stretching vibration of the esterified O-P-O bonds from the phosphate groups
875	asymmetric stretch vibration of the C-N bonds from the N ⁺ (CH ₃) ₃ choline group
972	bending vibration of the CH groups
1044	symmetric stretching vibration of PO ₄ ³⁻ group
1085	stretching vibration of C-C bond
1265	deformation vibration of the unsaturated =CH group
1302	twisting vibration of CH ₂ groups
1444	CH ₂ /CH ₃ scissoring vibrations
1658	C=C bond stretching vibrations
1741	stretching vibration of the C=O bond from the ester groups
2728	in-plane scissoring vibrations of CH ₂
2854	symmetric stretching vibration of the CH ₂ groups (fatty acids)
2895	asymmetric stretching vibration of the CH ₂ groups (fatty acids)
2929	symmetric stretching vibration of the CH ₃ groups
3010	stretching vibrations of unsaturated =C-H groups (fatty acids)

Table S4. Hyperthermia properties of PEGylated AuNPs and their liposomal complexes.

Sample	m _{Au} (g)	ΔT (K)	SAR (W/g)
PEGylated AuNPs	4.115·10 ⁻⁵	2.61	327
MMPNHs	4.113·10 ⁻⁵	3.08	450