ELECTRONIC SUPPLEMENTARY INFORMATION

Surface Engineering: Binary MgFe-LDH·xFe_3O_4 nanocomposites for Improved Magnetic Solid-Phase Extraction of Pharmaceuticals from Aqueous Solution

Tetiana Hubetska[1,2], Victor Demchenko[1], Natalia Kobylinska[1*]

[1]*A.V. Dumansky Institute of Colloid and Water Chemistry, National Academy of Science of Ukraine, 42 Akad. Vernadsky Blvd, Kyiv, 03142, Ukraine*
[2]*Nanomaterials and Nanotechnology Research Center (CINN-CSIC), University of Oviedo, Avda. de la Vega 4-6, El Entrego, 33940, Spain*

*Corresponding author: **Dr. Natalia Kobylinska**

e-mail: *kobilinskaya@univ.kiev.ua*

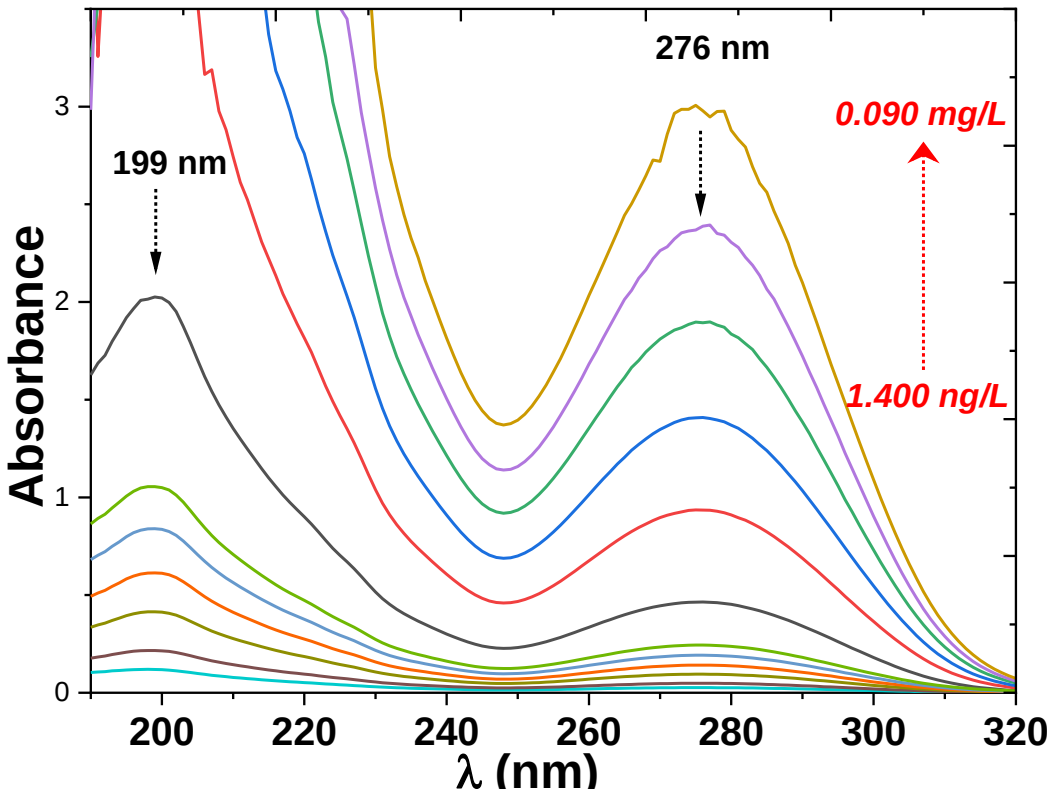


Figure *S1.* UV-Vis spectra of Diclofenac Sodium solution in the full linearity range

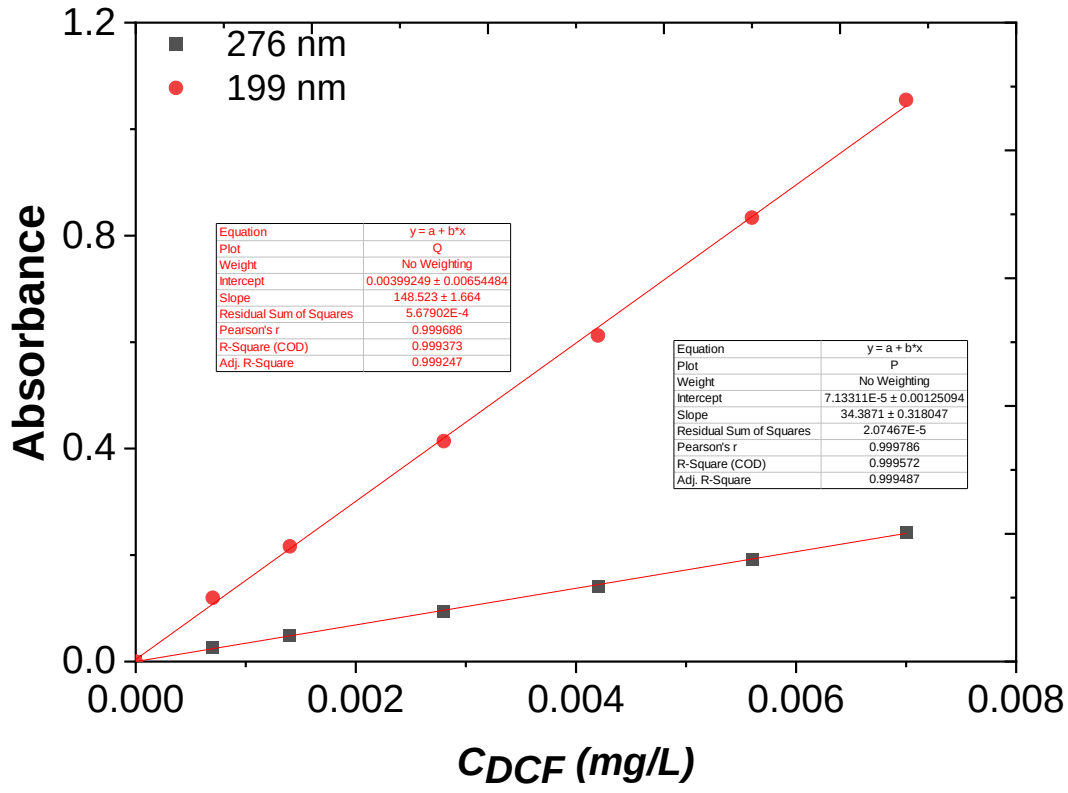


Figure S2. Calibration curves for determination of Diclofenac Sodium at various wavelengths: 276 nm and 199 nm

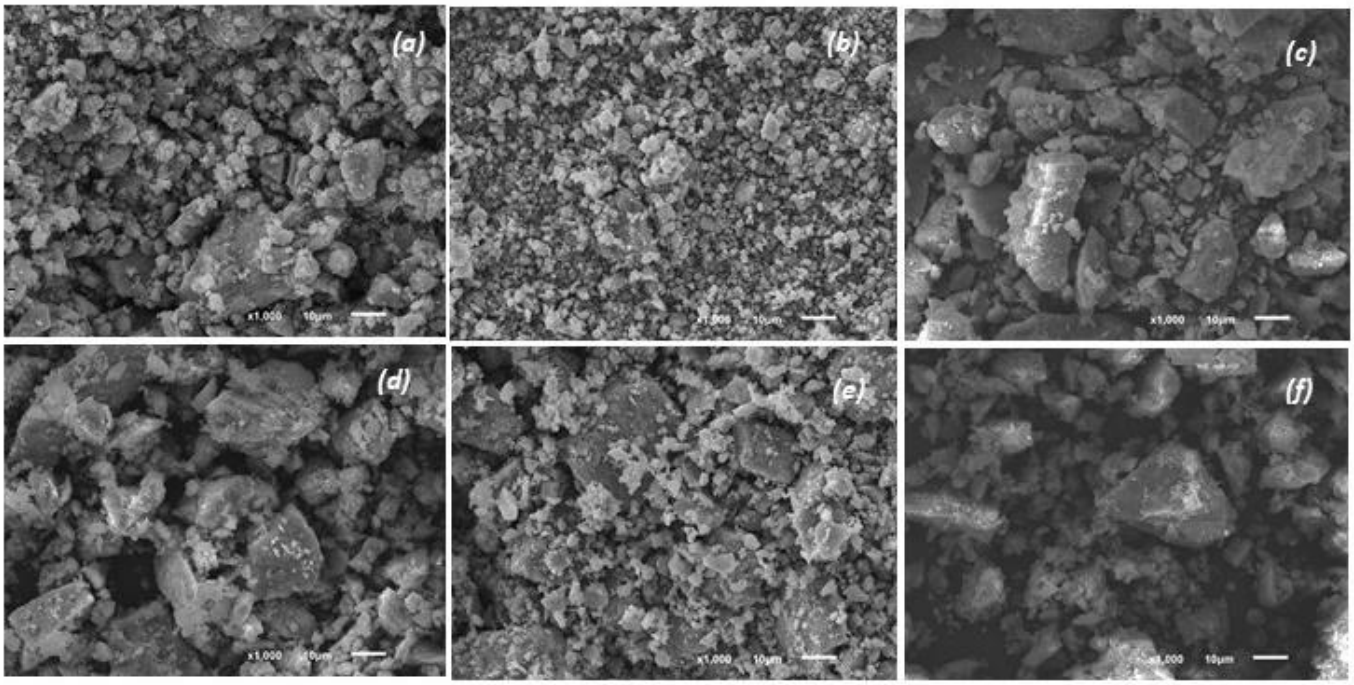


Figure S3. SEM images of pristine Fe_3O_4 (*a*), *Mg,Fe-LDHs* (b), *Mg,Fe-LDH·0.1*Fe_3O_4 (c), *Mg,Fe-LDH·0.3*Fe_3O_4 (d), *Mg,Fe-LDH·0.5*Fe_3O_4 (e) and *Mg,Fe-LDH·1.0*Fe_3O_4 (f) samples

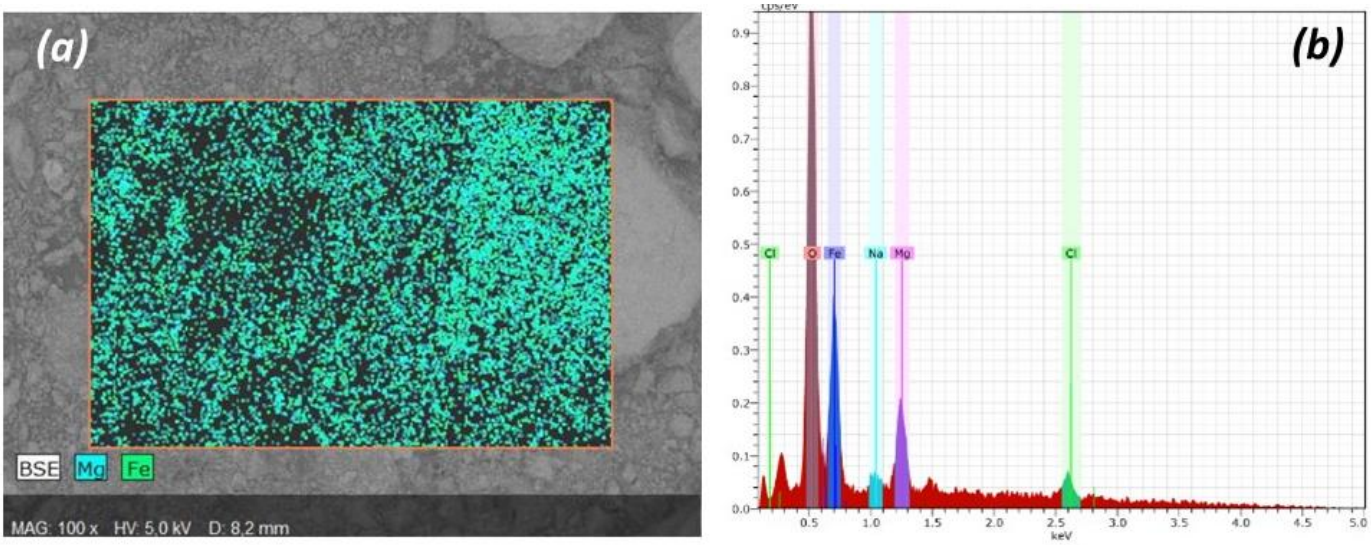


Figure S4. EDX mapping *(a)* and spectrum *(b)* of *Mg,Fe-LDHs* sample

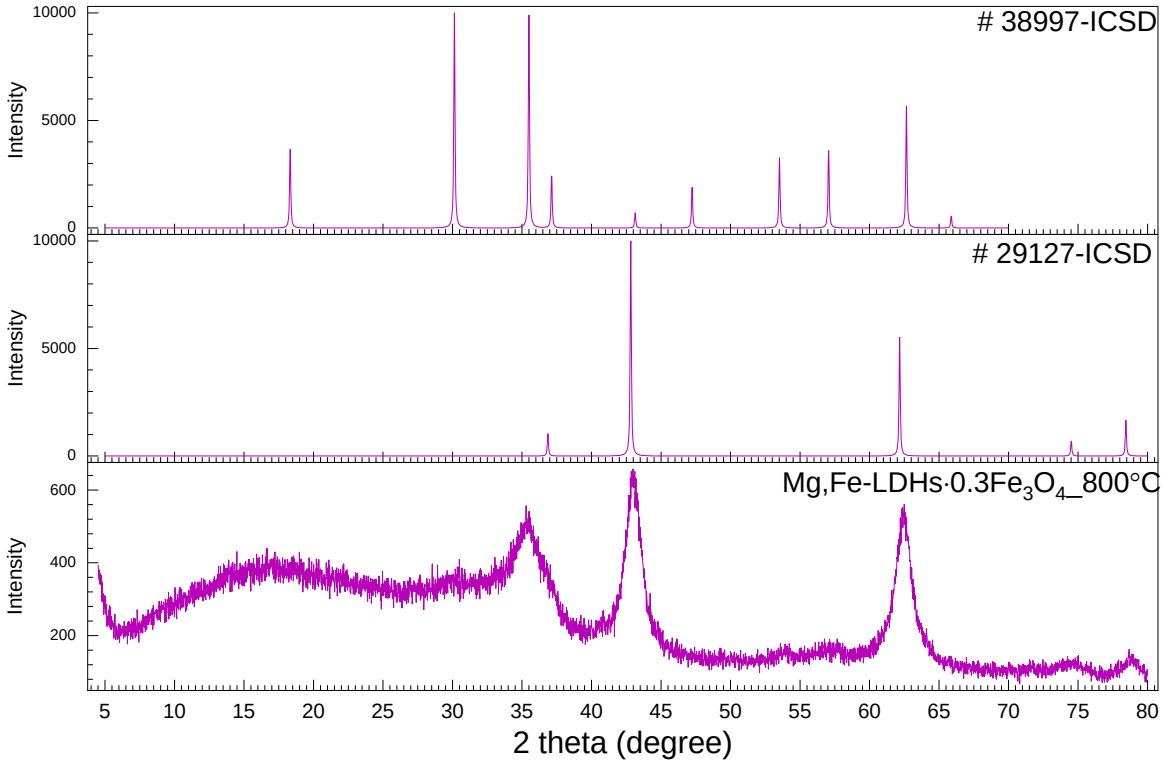


Figure S5. XRD patterns of *Mg,Fe-LDH·0.3Fe₃O₄* calcinated at 800°C and corresponding references ($MgFe_2O_4$ (# 38997-ICSD) and MgO (# 29127-ICSD))from ICSD database

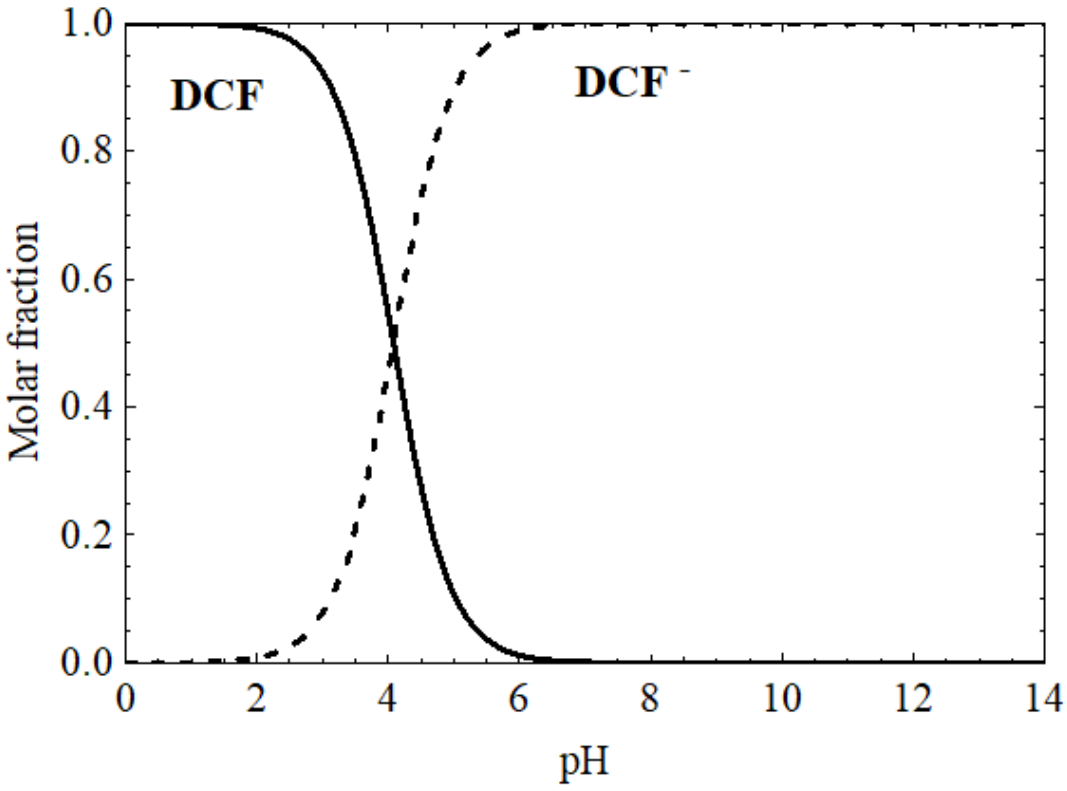


Figure S6. Speciation diagram of DCF as a function of the pH solution

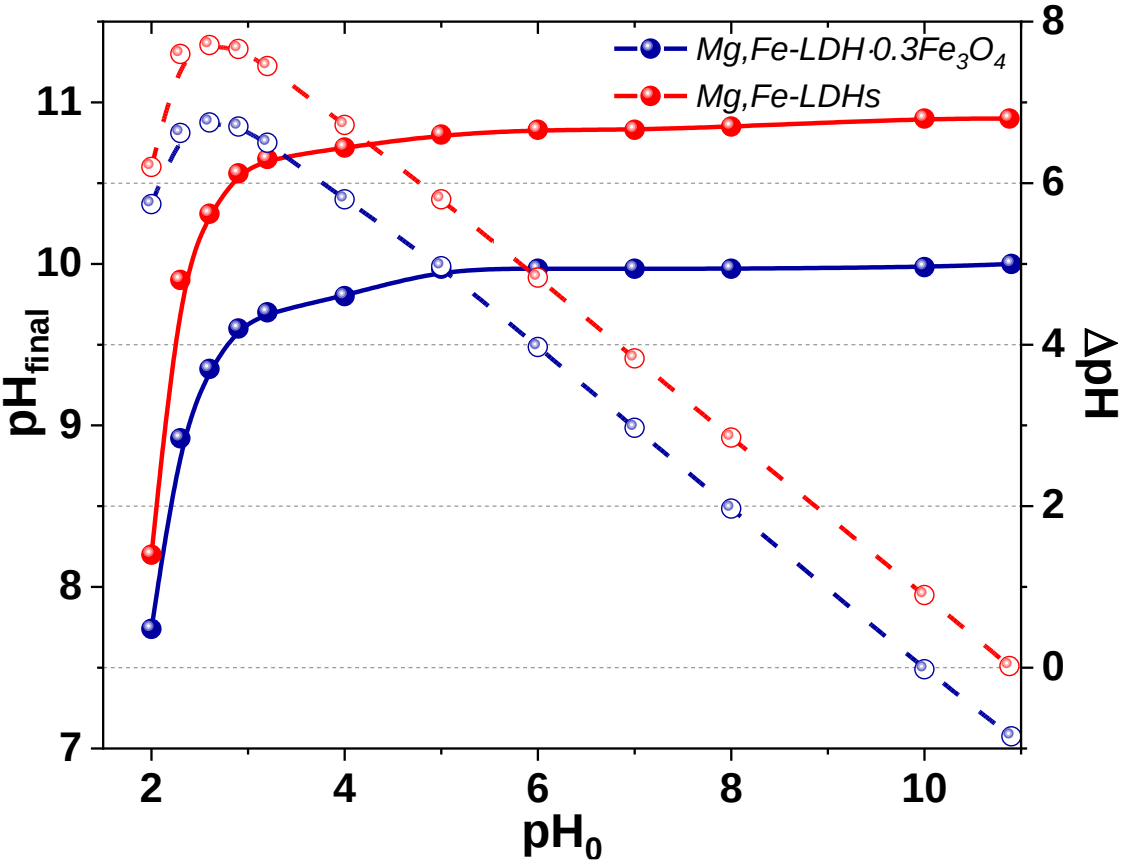


Figure S7. The pH_{PZC} determination for obtained adsorbents (*Conditions*: weight 0.050 g, volume 50 mL, time 24 h, C($NaClO_4$) = 0.1 M)

Table S1. Parameters for the intra-particle diffusion kinetic model of the as-prepared materials

Sample	1st stage			2nd stage			3rd stage		
	K_i	C	R^2	K_i	C	R^2	K_i	C	R^2
Mg,Fe-LDHs	0.0463	0.0012	0.9996	0.024	0.134	0.9279	0.00075	0.3781	0.7494
Mg,Fe-LDH·0.3Fe₃O₄	0.0407	0.0028	0.9974	0.023	0.109	0.9224	0.0016	0.332	0.8836
Mg,Fe-LDH·0.5Fe₃O₄	0.0295	0.0016	0.9974	0.020	0.062	0.9447	0.0310	0.2392	0.8394
Fe_3O_4	0.00265	0.0005	0.9805	-	-	-	0.0009	0.0158	0.9142

Table footnotes. **K_i -** rate constant of intraparticle diffusion, (mmol·g^{-1} min$^{-1/2}$); C - the intercept, (mmol/g).

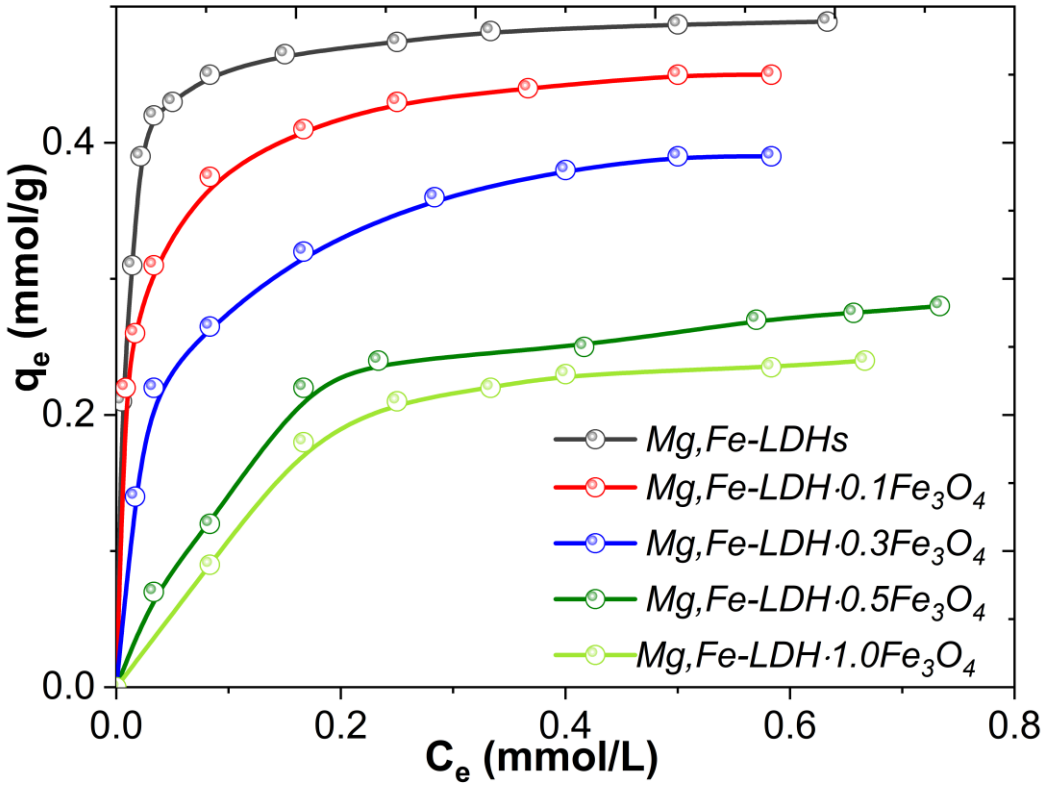
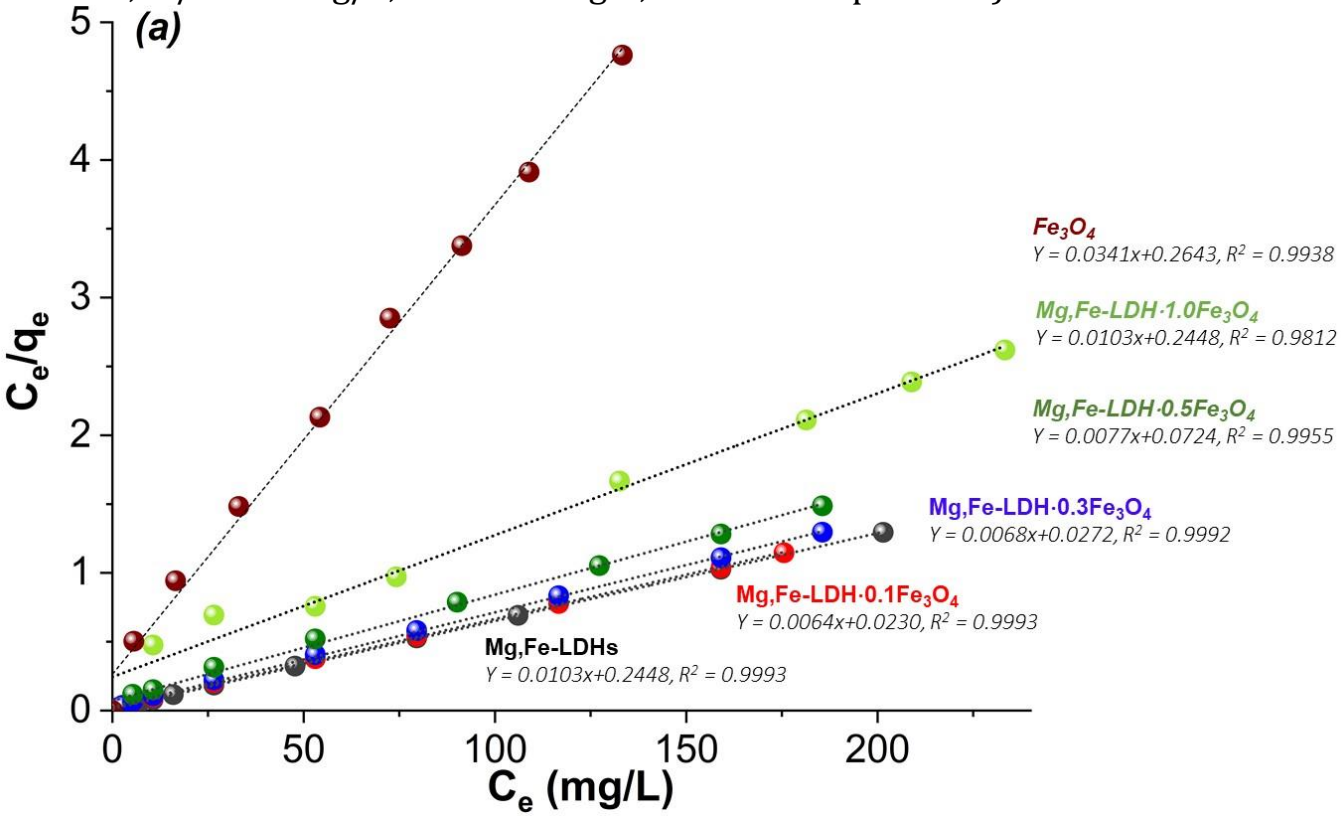


Figure S8. Adsorption isotherms (mmol/g) of DCF onto *Mg,Fe-LDHs* and corresponding magnetic nanocomposites at room temperature (*Conditions:* pH = 7.5 ± 0.1, m/V = 1.00 g/L, time overnight, at room temperature)



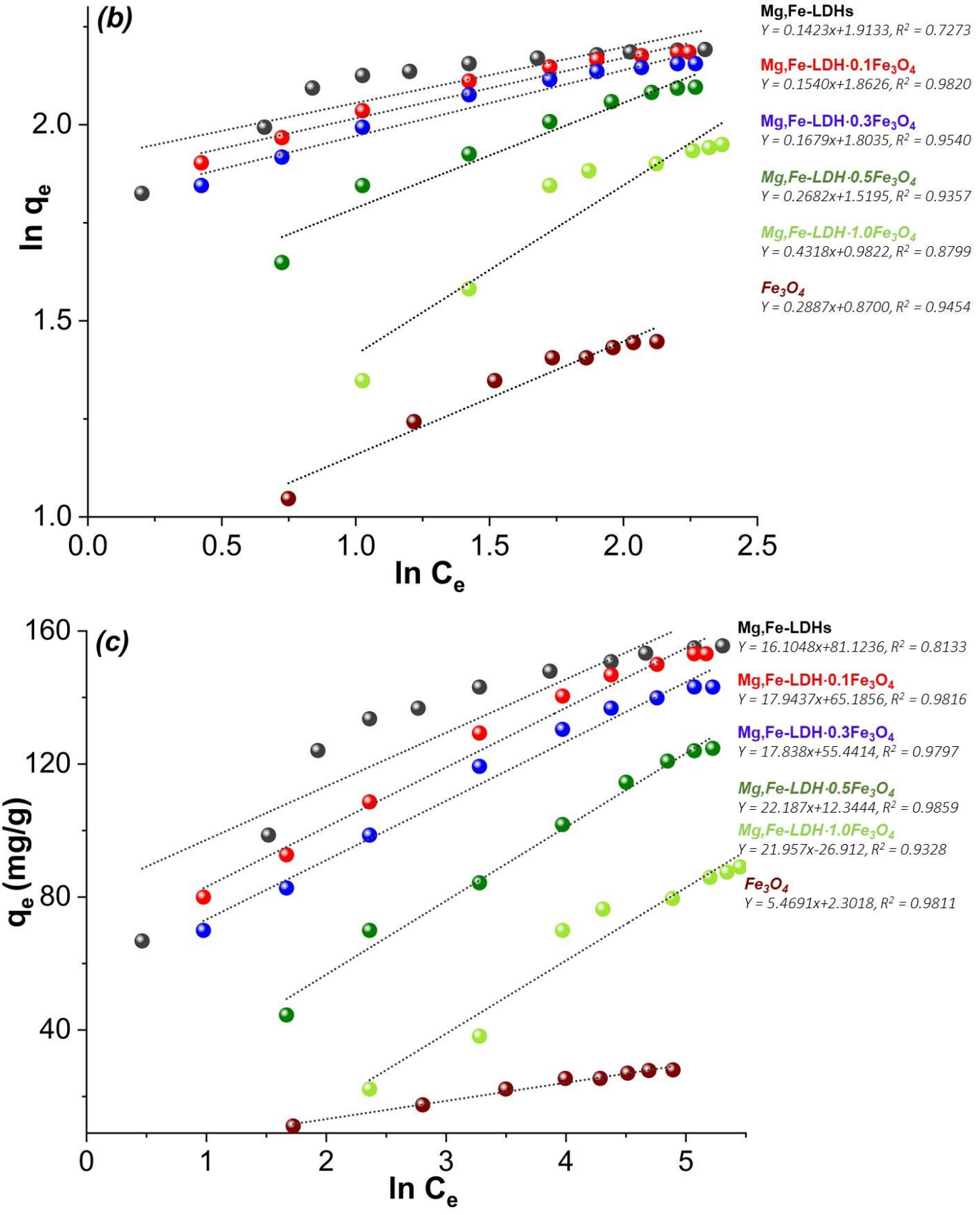


Figure *S9.* Linear fitting of adsorption isotherms with Langmuir *(a),* Freundlish *(b)* and Temkin (c) equations for DCF on obtained samples