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Magnetic diatom shells: Nature's blueprint for cellular transport

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Supporting information

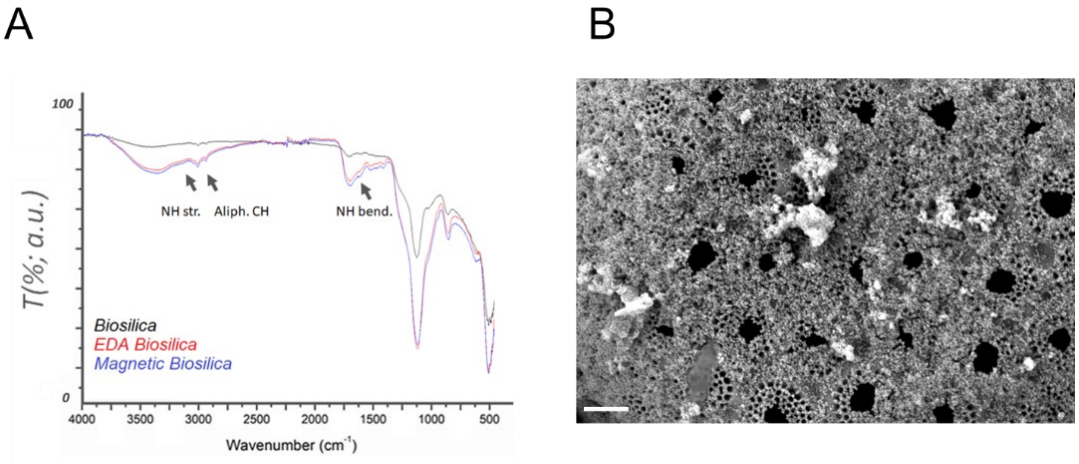

Figure S1. A) FTIR spectra of the magnetic shells during the different synthetic steps. B) SEM image of the surface of a NPs-decorated shell (scale bar is 1 μm);

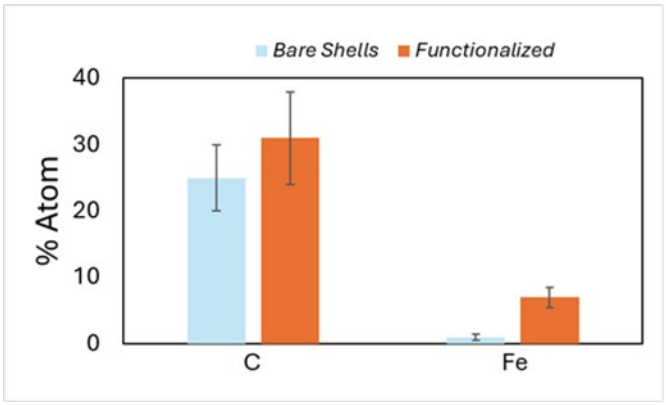

Figure S2. EDX analysis reporting elemental composition (specifically carbon and iron content) of the diatom shells before and after functionalization with magnetic nanoparticles

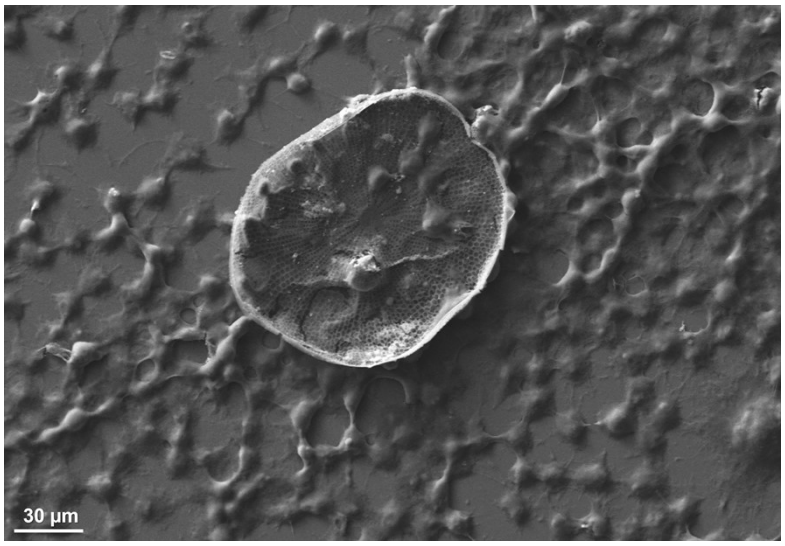

Figure S3. SEM image of cells growing on a magnetic diatom shell. After 72 hours cells are firmly adhered to both the support substrate and to the magnet, anchoring the shell to the surface. Magnification: 1000X, EHT: 15 kV.

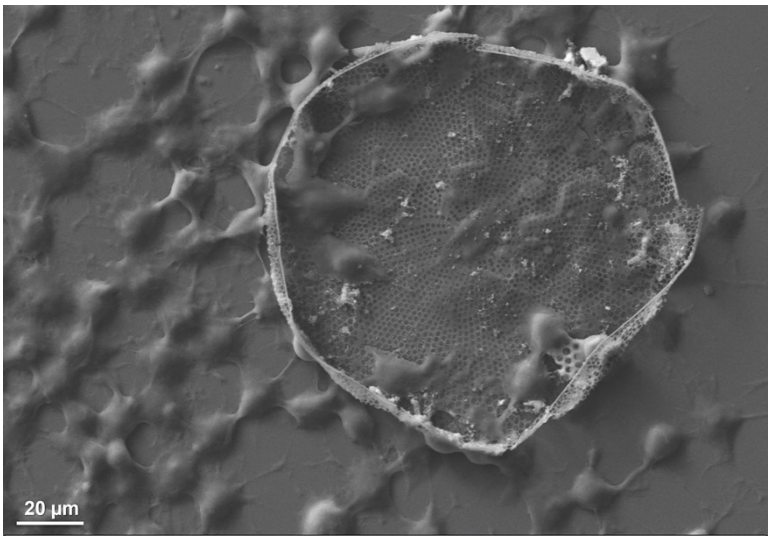

Figure S4. SEM image of cells growing on a magnetic diatom shell. After 72 hours cells are firmly adhered to both the support substrate and to the magnet, anchoring the shell to the surface. Magnification: 1500X, EHT: 15 kV.

Contact time (MNPs and shells); minutes	**Presence of extra-shell polydopamine formation**	**Magnetization (induced with external magnetic field *via* NdFeB magnet)**
1	No	No
5	No	No
10	No	Yes

30	Partial	Yes
60	Abundant	Yes
90	Abundant	Yes
120	Abundant	Yes

Table S1. Key parameters for evaluation of efficient functionalization of diatom shells.

Supporting Video 1. Video demonstrating the movement of diatom shells functionalized with magnetic NPs through a small NdFeB magnet.

Supporting Video 2, 3 and **4.** Videos showing magnetic diatoms loaded with several cells rotating due to the presence of an underlying moving magnet.