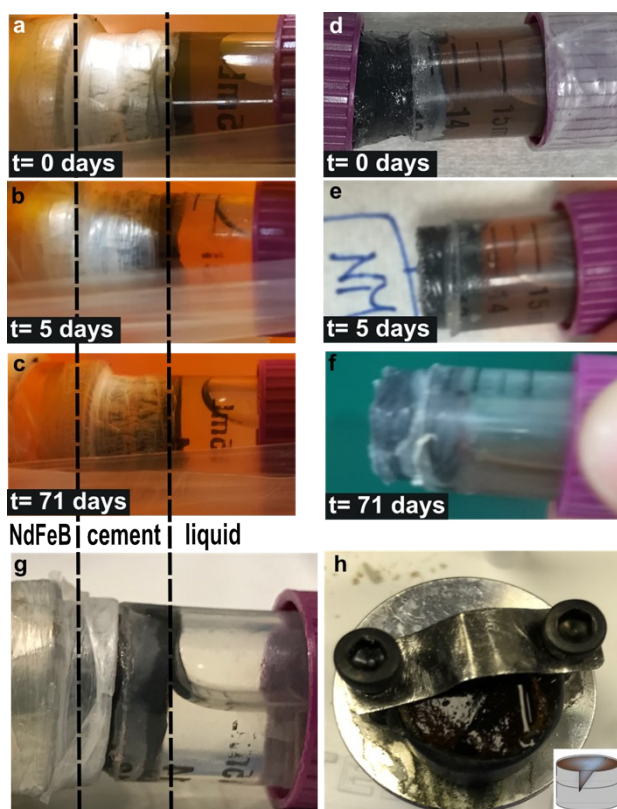
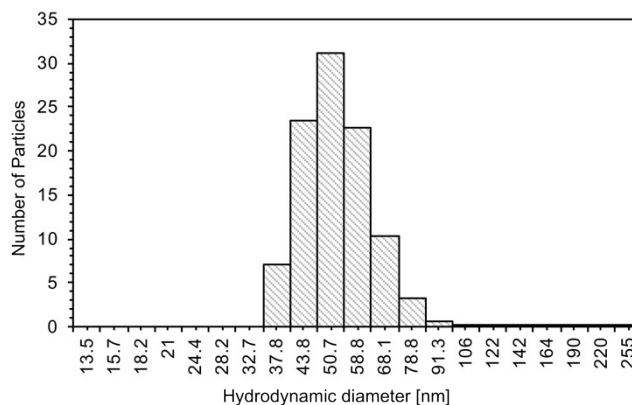


Supplementary Information

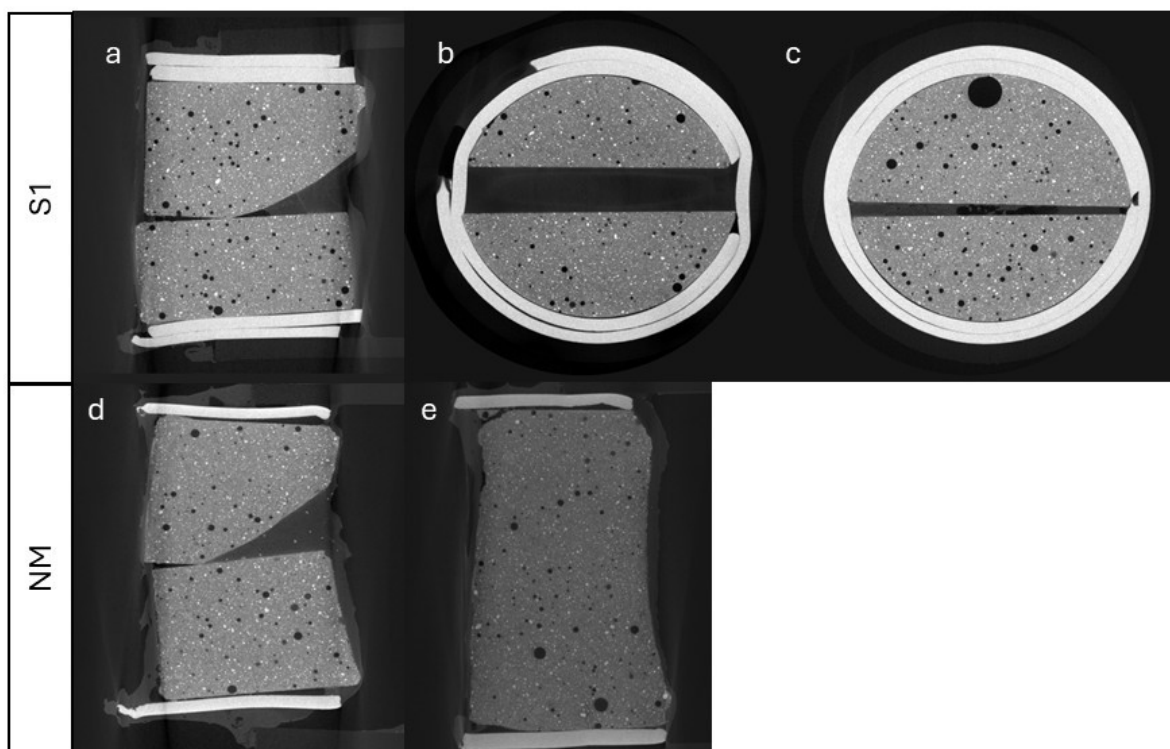
Supplementary Figures



SI Figure 1: Picture of $\text{SiO}_2@Fe_3O_4$ NPs suspension in contact with the cement cylinder upon application of a 0.48 T magnetic field (a), after 5 days from the application (b), and after 71 days from the application (c). The NdFeB magnet is fixed on the side of the suspension container, which was left horizontal for the whole duration of the experiment. Photos of the same suspension for the sample where the magnet was not applied (NM) at the same time intervals, respectively (d), (e), (f). Picture of the $\text{SiO}_2@Fe_3O_4$ gelled on the cracked cement section right before (g) and after (h) water removal before environmental SEM analysis. For (a, b, c, g), the black dotted lines have been added as visual aid of the position of the magnet, the cement sections, and the liquid.



SI Figure 2: Size distribution of the SiO₂-coated Fe₃O₄ NPs described in this work obtained by DLS. The size distribution of the suspension measured in water was found to be 53.1 ± 10.3 nm. Sample preparation for DLS analysis required dilution to ~ 0.5 mg/mL of the SiO₂ coated-NPs in water to avoid signal saturation. For the measurements, the sample was transferred to a polystyrene cuvette and analysed using a Malvern Zetasizer Nano. The sample was equilibrated for 120 s before measuring at 25 °C for three sequential repeats of 60 seconds each to detect possible particles sedimentation/aggregation over time, if any. The results as average of the three repeats are plotted as Number of Particles (%) vs. Size (d, nm).



SI Figure 3: Unaltered version of figures shown in Figure 5. X-CT scan of sample S1 and NM (no magnetic field applied). (a) Vertical cross section of sample S1 showing solid gel formation at the surface where the cement-colloidal suspension interface was present. (b) A horizontal cross-section of sample S1 taken close to the top surface (cement – silica suspension interface) showing the wedged area to be filled by colloidal silica. (c) A horizontal cross-section of sample S1 taken at the bottom of the wedged section showing partial filling of the wedged section. (d) Sample NM (cross-section plan is transversal to the wedge plan); (e) vertical cross-section of sample NM (cross-section plan is parallel to the wedged plan).