

Supplementary files

Inhibitor encapsulated, self-healable and cytocompatible chitosan multilayer coating on biodegradable Mg alloy: a pH-responsive design

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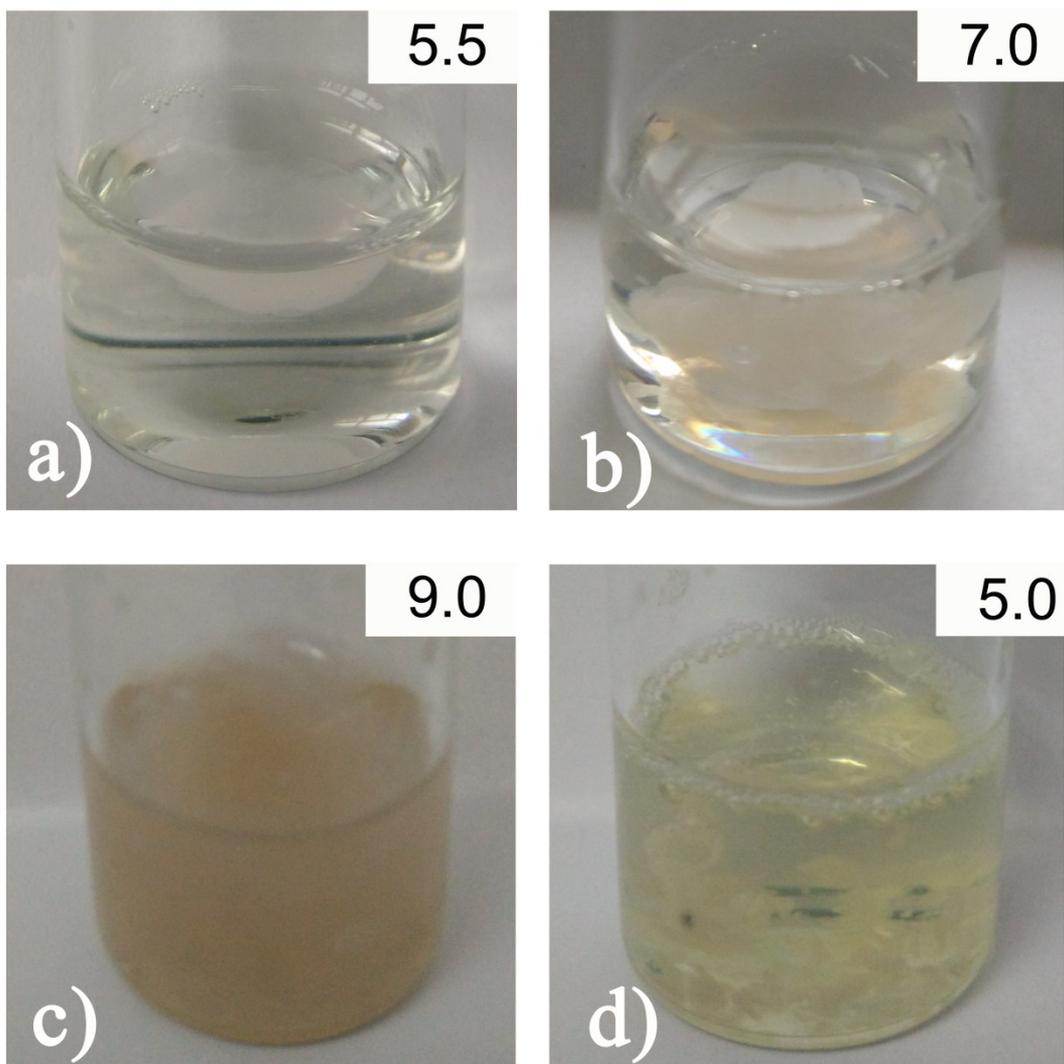


Fig. S1 The pH sensitivity of the CSCe solution: (a) as-prepared powder suspension, and the solution with pH value adjusted to 7.0 (b), and 9.0 (c) by adding 0.5 M NaOH. During this process, a transformation from colorless solution to yellowish colloid was observed. (d) The colloid in (c) was majorly dissolved when its pH was brought back to 5.0 by HCl, however, there was still yellowish deposits in the bottom.

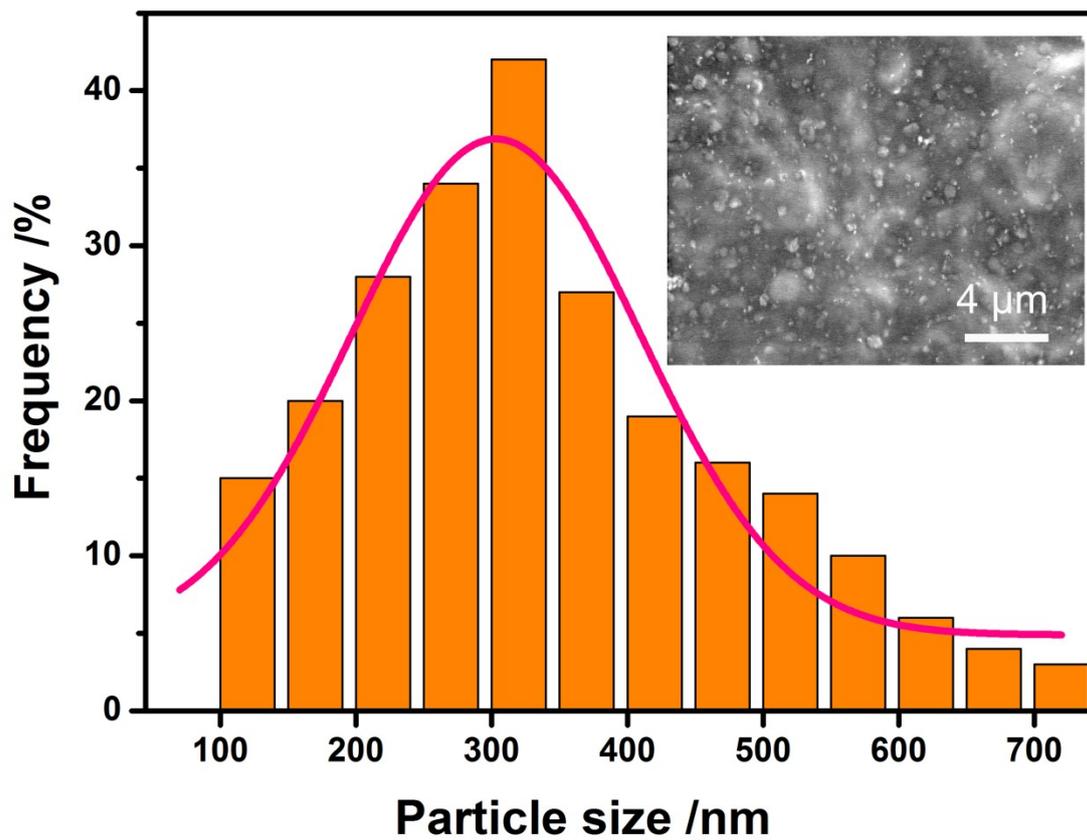


Fig. S2 The size distribution of cerium particles in the chitosan layers, with inset the representative SEM graph.

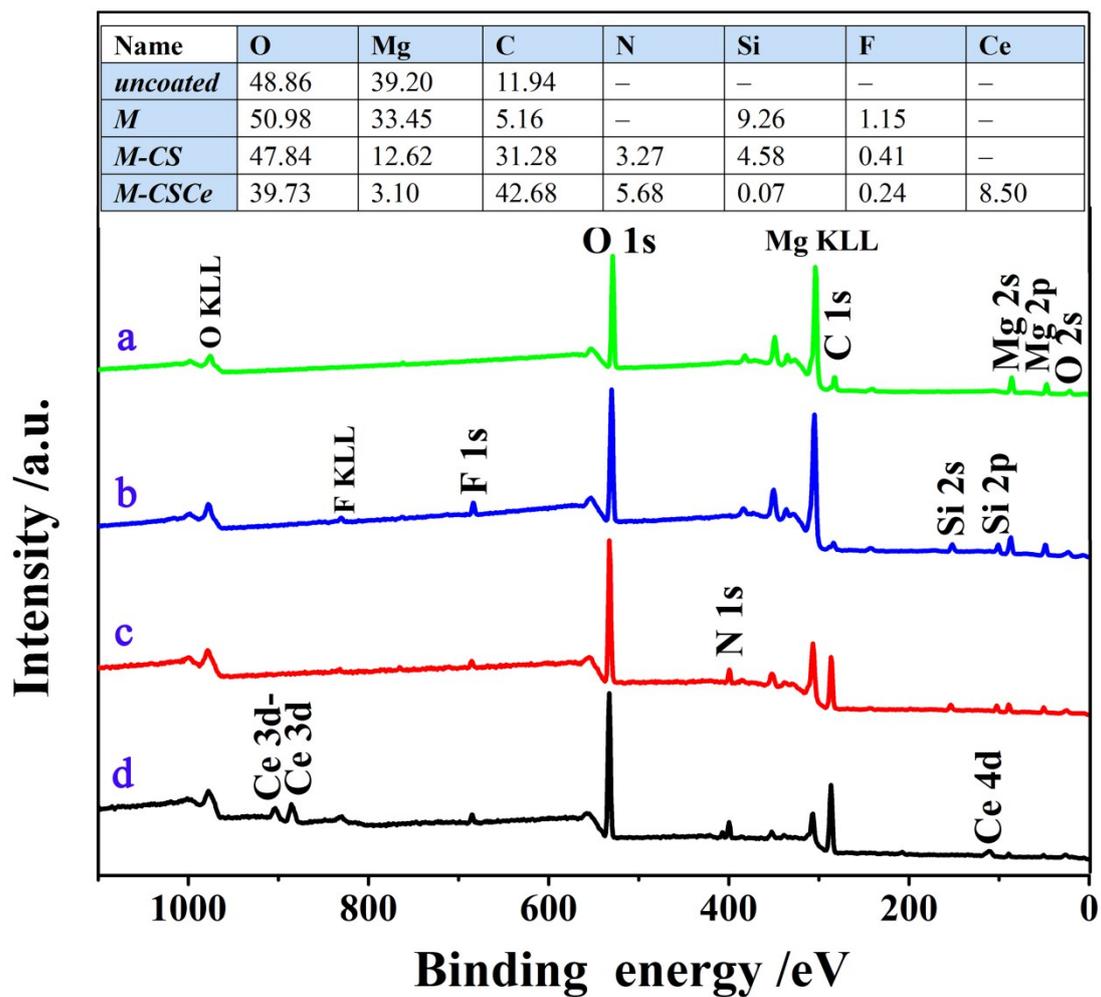


Fig. S3 XPS survey spectra of (a) uncoated Mg-1Ca, and that with (b) M, (c) M-CS, and (d) M-CSCe coatings. (Inset) the quantification results.

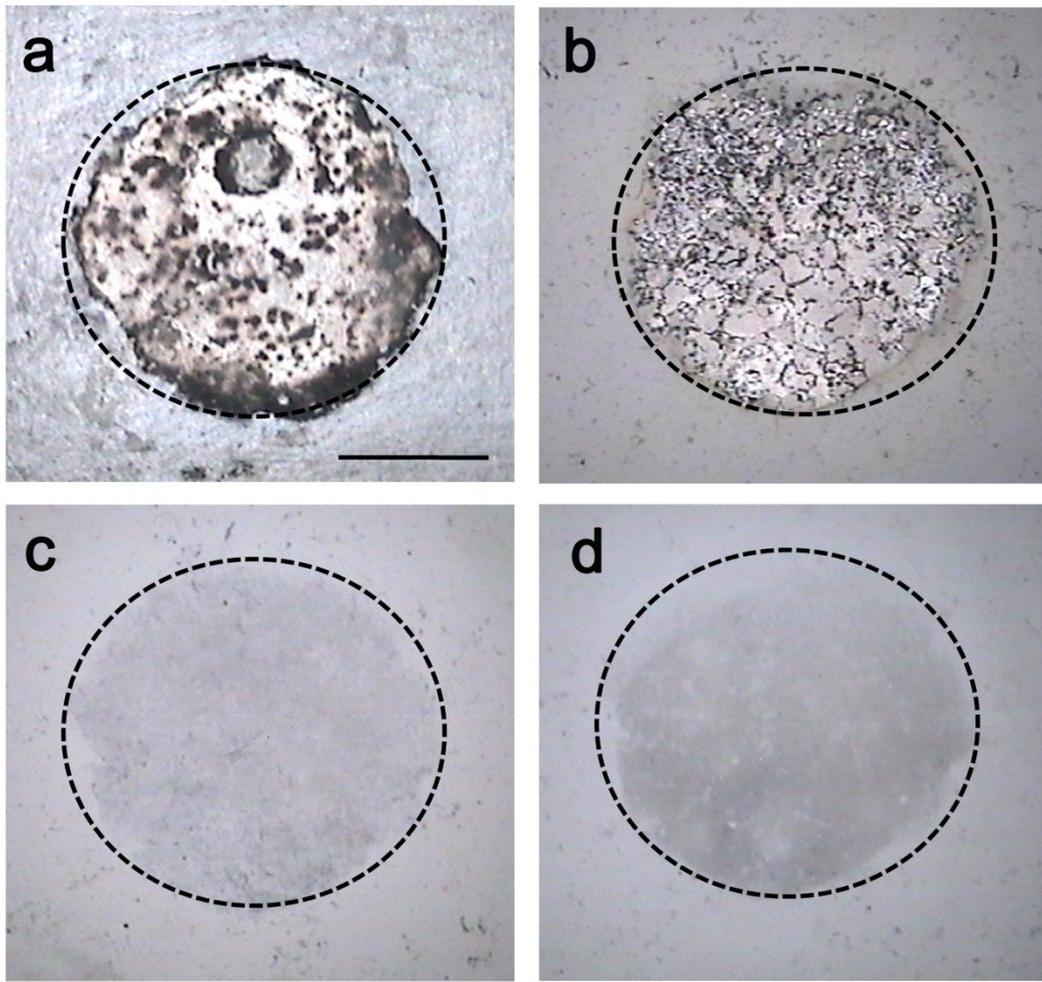


Fig. S4 The optical appearance of different samples after EIS measurements: (a) uncoated, (b) M, (c) M-CS, and (d) M-CSCe. Scale bar = 2 mm.

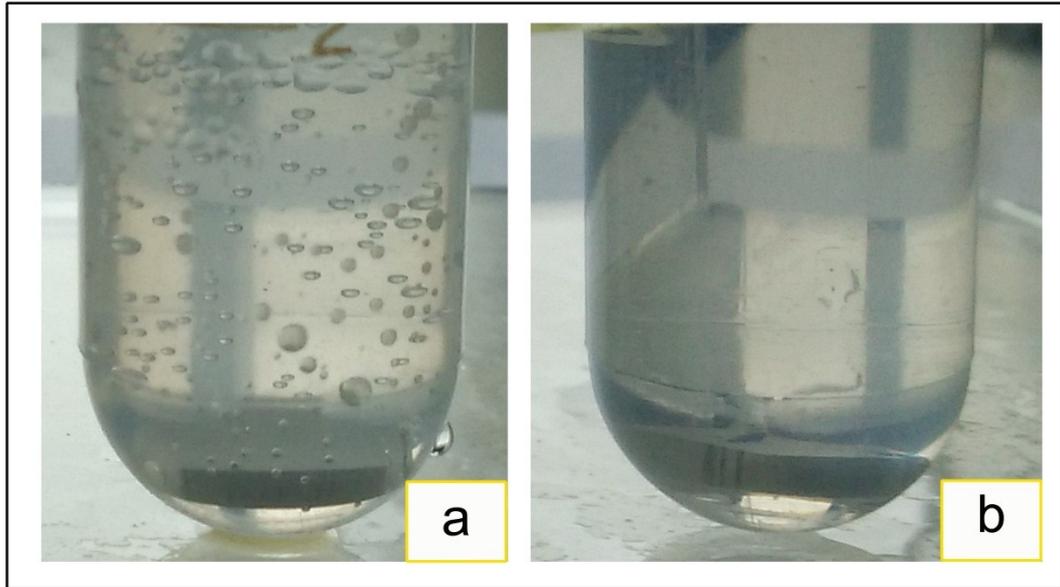


Fig. S5 The evolution of hydrogen after 1-h immersion: (a) uncoated, (b) M-CSCe.

Note: SBF (colorless) was used instead of DMEM (red) for better visualization of the gas bubbles.

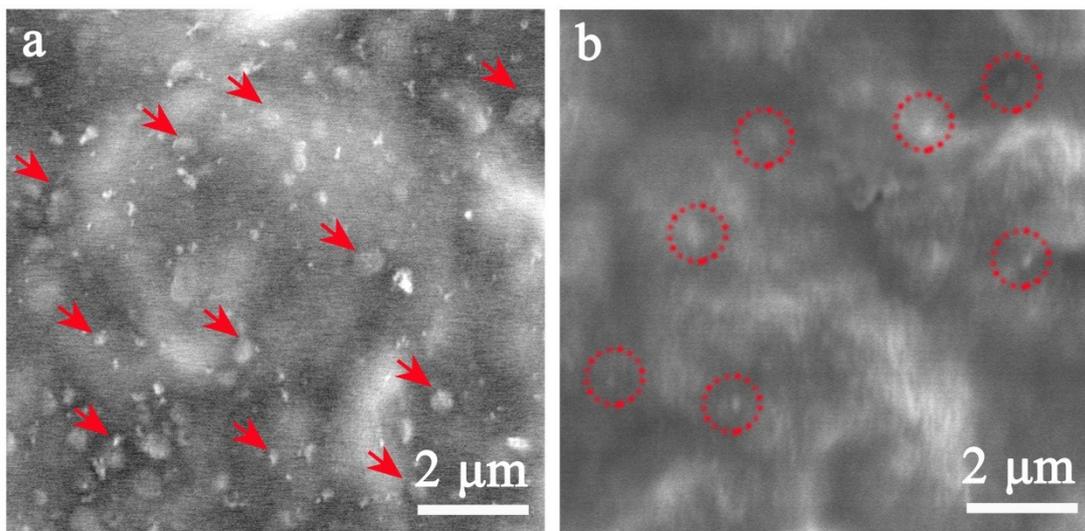


Fig. S6 A contrast between the morphologies of (a) the as-prepared M-CSCe coating at pH 5.5 and that after immersion test in pH 8.5 (the result of Fig. 6a). Note there were a lot of cerium nanoparticles (arrows in a) in the pristine coating; only a few particles (circles in b) were visible after medium contact, with most of the particles probably being consumed during the “self-healing” process.

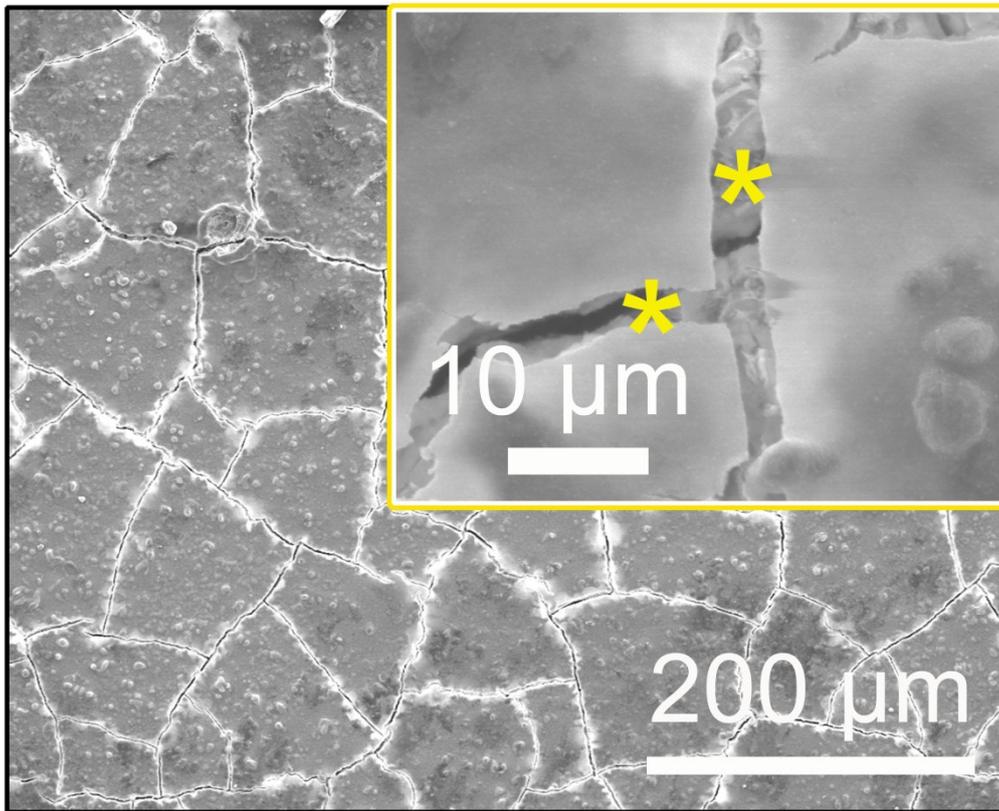


Fig. S7 The microstructure of the M-CS samples after immersion testing. Asterisks indicate microcracks, which were present both in the chitosan layers and in the ceramic coating underneath.

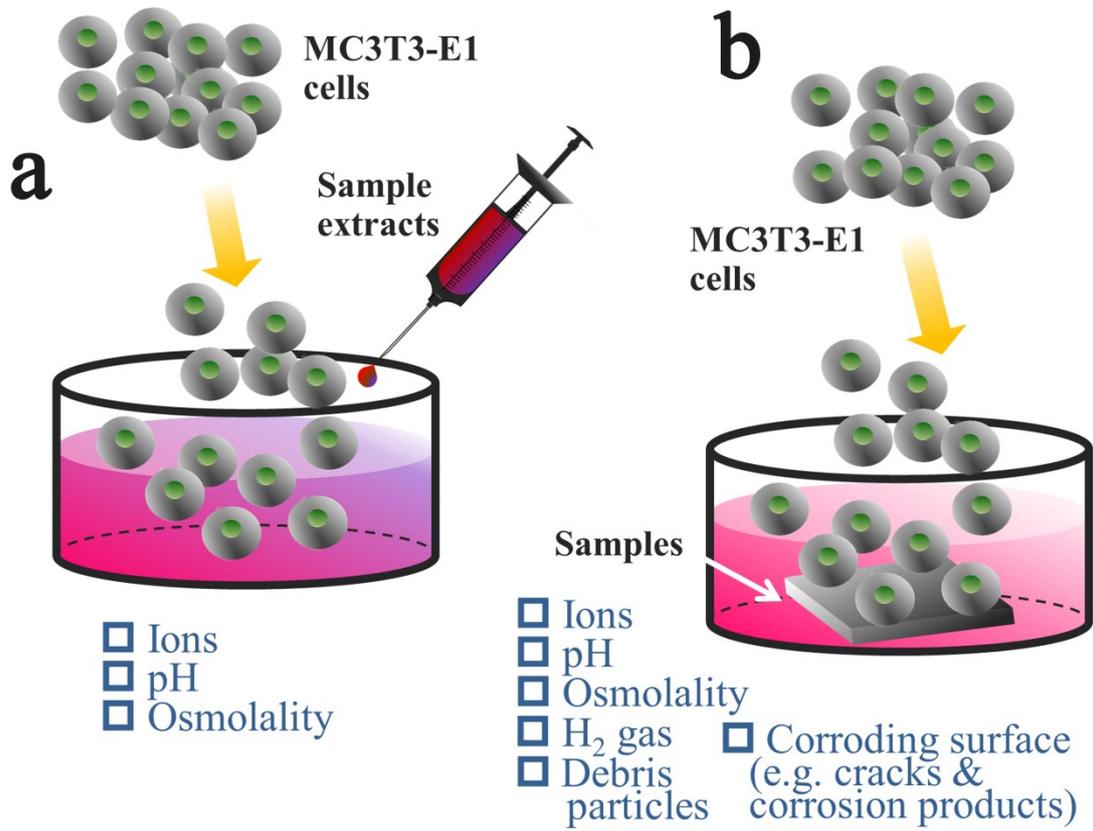


Fig. S8 Scheme of the two culture methods involved in the experiments, with the potential factors affecting the results listed below.