

Abstract Submitted  
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**Evolution of “waterproof” photoluminescent complexes of rare earth ions in crowded environment**<sup>1</sup> MICHAEL BLADES, Lehigh University, TETYANA IGNATOVA, UC Irvine, JUAN DUQUE, STEPHEN DOORN, Los Alamos National Lab, IVAN BIAGGIO, SLAVA V. ROTKIN, Lehigh University — Understanding behavior of rare-earth ions (REI) in crowded environments is crucial for several nano- and bio-technological applications. Evolution of REI photoluminescence in small compartments inside a silica hydrogel, mimic to a soft matter bio-environment, has been studied [doi: 10.1039/C4CP04342A] and explained within a solvation model. The model uncovered the origin of high rare earth photoluminescence efficiency to be the formation of REI complexes, surrounded by sodium deoxycholate molecules. Comparative study of these REI-deoxycholate complexes in bulk water solution and those enclosed inside the hydrogel revealed a strong correlation between an up to 5 times longer photoluminescence lifetime of REIs and appearance of the deoxycholate ordered phase, further confirmed by dynamics of REI solvation shells, REI diffusion experiments and morphological characterization of microstructure of the hydrogel.

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