Squaramide Magnetic Iron Nanoparticles for the Selective Removal of Hg^{2+} Ions in Water

Kenia López, M. Nieves Piña and Jeroni Morey

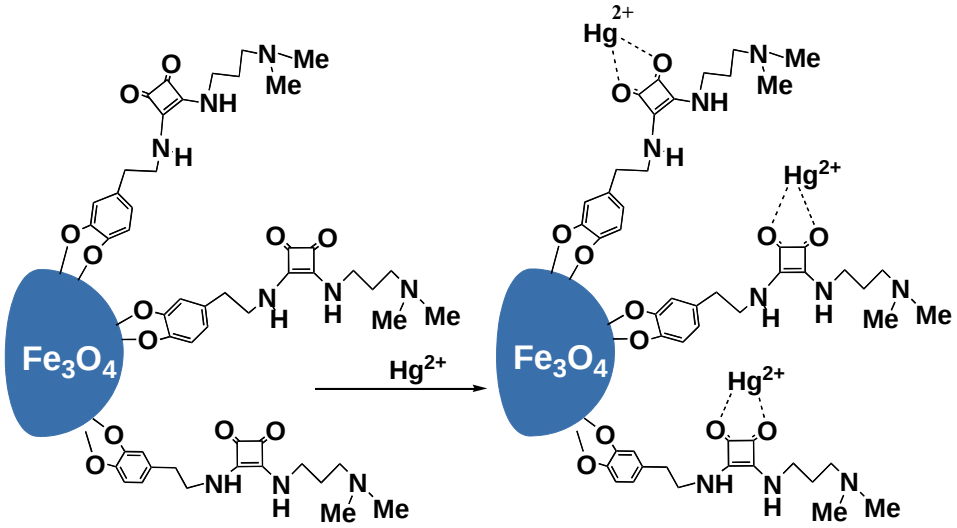
Department of Chemistry, University of the Illes Balears, Palma de Mallorca, Spain
jeroni.morey@uib.es

Elimination of mercury and its compounds in the environment is of great interest because of their high toxicity, wide usage in a number of industrial processes, and biomagnification in the food chain. Because the squaramide unit showed unusual selectivity[1] for Hg^{2+}, we have investigated the interactions of squaramide based on nanomagnetic iron particles (1) with Hg^{2+} at pH 4 in water.

The iron nanoparticles were synthesized as described by Sun[2]. Here we report a simple approach to conjugate monodisperse Fe_3O_4 nanoparticles with various squaramide-dopamine units.

Our results[3] show that 20 mg of hybrid nanomagnetic iron particles (1) remove 56% of a Hg^{2+} solution of 377 mg/L. However, the Fe_3O_4 nanoparticles without functionalization only remove 17%.

The regeneration of nanomagnetic iron particles (1) was carried out using 2 x 5 mL of 0.1 M EDTA as eluent. The removal of Hg^{2+} obtained with that recovery nanomaterial was lower, 34%, in the first two cycles and only 24% in the third cycle.



(1)

References

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