Synthesis and characterization of magnetite nanoparticles functionalized with organophosphorus compounds and its application as an adsorbent for La (III), Nd (III) and Pr (III) ions from aqueous solutions

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© 2018 In this communication, adsorbents based on functionalized magnetite nanoparticles were synthetized, characterized and evaluated as adsorbents for the uptake of La (III), Pr(III) and Nd(III) from aqueous solutions. The functionalization of the magnetite nanoparticles was conducted by coating them in the first step with oleate molecules through a chemisorption process, resulting in a hydrophobic nanomaterial. In the second stage, the hydrophobic material was coated with the organophosphorus extractant CYANEX 272, CYANEX 301 or D2EHPA, resulting in three hydrophilic adsorbent magnetic materials. The structures and surface features of these adsorbents were determined by high-resolution transmission electronic microscopy, energy-dispersive X-ray spectroscopy, thermogravimetric analyses, FT-IR, zeta-potential and magnetism techniques. The functionalized magnetite nanoparticles tend to exhibit a spherical morphology averaging a diameter of approximately 7 nm. Additionally, they would b