Ceramic Composites and Its Applications for Pb Adsorption

Authors : C. L. Popa, S. L. Iconaru, A. Costescu, C. S. Ciobanu, M. Motelica Heino, R. Guegan, D. Predoi

Abstract : Surface functionalization of ceramic composites with a special focus on tetraethyl orthosilicate (TEOS) and hydroxyapatite (HAp) is discoursed. Mesoporous ceramic HAp-TEOS composites were prepared by the incorporation of hydroxyapatite into tetraethyl orthosilicate by sol-gel method. The resulting samples were analysed by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform infrared (FT-IR) spectroscopy, and Raman spectroscopy and nitrogen physisorption. The removal of Pb2+ ions from aqueous solutions was evaluated using Atomic Absorbtion Spectroscopy (AAS). Removal experiments of Pb2+ ions were carried out in aqueous solutions with controlled Pb2+ at pH ~ 3 and pH ~ 5. After removal experiment of Pb2+ at pH 3 and pH 5, porous hydroxyapatite nanoparticles is transformed into PbHAp_3 and PbHAp_5 via the adsorption of Pb2+ ions followed by the cation exchange reaction. The diffraction patterns show that THAp nanoparticles were successfully coated with teos without any structural changes. On the other, the AAS analysis showed that THAp can be useful in the removal Pb2+ from water contaminated.

Keywords : teos, hydroxyapatite, environment applications, biosystems engineering
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