Heavy-metal extraction from aqueous medium with an immobilized TiO_2 photocatalyst and a solid sacrificial agent

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Abstract

A system consisting of a layer of calcium oxalate coated on paper followed by a layer of TiO_2 above calcium oxalate is found to extract heavy metals (Pb, Hg) from an aqueous medium under solar irradiation. The mechanism involves the transfer of photogenerated electrons to metal ions in the solution with consumption of holes by calcium oxalate. It is suggested that dangling carboxylate bonds on the surface of calcium oxalate facilitate hole transfer towards calcium oxalate.

Keywords: Heavy metal removal; Photocatalysis; Titanium dioxide; Sacrificial agent