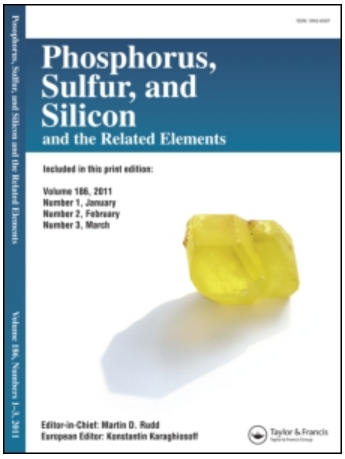

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Synthetic Hydroxyapatites as Inorganic Cation-Exchangers; Exchange Characteristics for Pb^{2+} and Sn^{2+} Ions in Acidic Solution

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SYNTHETIC HYDROXYAPATITES AS INORGANIC CATION-EXCHANGERS; EXCHANGE CHARACTERISTICS FOR Pb^{2+} AND Sn^{2+} IONS IN ACIDIC SOLUTION

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The cation-exchange characteristics between Pb^{2+} ions of aqueous solutions containing counter-anions (F^-, Cl^-) and Ca^{2+} ions of synthetic hydroxyapatite samples have been investigated in detail under the conditions of low pH values (3.0, 4.0 and 5.0) by a normal batch method. Even at the low pH value of 3.0 the apatite structure in a solution containing F^- or Cl^- ions was maintained via a concurrent ion-exchange effect of Pb^{2+} ions together with F^- or Cl^- ions, which are known to be exchangeable with OH^- ions of the apatite. Moreover, it was found that Ca^{2+} ions in the apatite sample can easily be exchanged for Pb^{2+} ions almost without distinction between M1 and M2 sites, assisted by the loosening effect of protons even at room temperature. Next, it was found that the hydroxyapatite samples are transformed into amorphous states by the reactions between Ca^{2+} ions in the samples and Sn^{2+} ions in the $SnCl_2$ acidic aqueous solutions with pH of 3.0 or below with a molar ratio of $Sn^{2+}/Ca^{2+} \sim 1.0$. The existence of hydroxyapatite as amorphism in acidic aqueous solutions such as $SnCl_2$ is quite interesting, because in general the hydroxyapatite has been found to be dissolved in acidic aqueous solutions. Moreover, the obtained amorphism are found to be stable up to at least 500 to 600°C but to be unstable in alkaline solutions. The characteristics of Sn^{2+} ions are found to be quite different from those of homologous Pb^{2+} ions which have been found to form crystalline Pb^{2+} apatite even in such an acidic atmosphere.