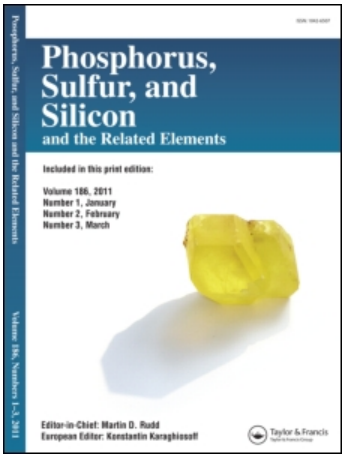

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Precipitation of Rare Earth Phosphates from H_3PO_4 Solutions

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PRECIPITATION OF RARE EARTH PHOSPHATES FROM H_3PO_4 SOLUTIONS

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Abstract A study of several factors has been carried out in order to determine their influence on rare earth phosphates precipitation from H_3PO_4 solutions obtained after the treatment of the Kola phosphate rock.

Key Words: *Lanthanides, Rare Earth Phosphates, Precipitation.*

Neutralization of H_3PO_4 solutions obtained after phosphate rock treatment leads to the formation of colloidal systems which give rise to the poorly soluble rare earth (RE) phosphates. They represent predominantly the Ce group, Y and Sc[1]. A study of several factors (temperature, pH, presence of Ca^{2+}, Al^{3+}, Fe^{3+}, F^-, SiF_6^{2-}) has been carried out in order to determine their influence on the properties of the phosphates precipitated as well as on the recovery of RE. Turbidimetric and electron microscopy techniques allowed the measurements of the particles sizes. The processes may be described by the equation:

$$dc/d\tau = -kc^2 ,$$

where c represents particle concentration at the moment τ. It explains the prolonged time needed for decantation and the difficulties in the filtration processes. High temperatures stimulate faster aggregation of the particles. Several cations stabilize colloidal dispersions. In spite of the relatively large size of the particles the precipitation rate is low owing to the tendency of such systems for gel formation. The anions reduce the size of the particles considerably reducing RE extraction from the acid. In contrast, at lower pH the average particle size grows and pH = 2 allows the precipitation of the RE up to 90%. Sc and Y recoveries are much inferior, 45 and 29% respectively.

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