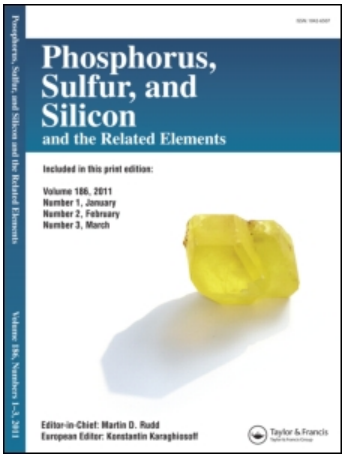


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# The Production of Calcium Phosphate from Natural Raw Material Using Liquid-Phase Process with Recycle

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# THE PRODUCTION OF CALCIUM PHOSPHATE FROM NATURAL RAW MATERIAL USING LIQUID-PHASE PROCESS WITH RECYCLE

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The graphic investigation of basic equilibrium systems CaO-$-P_2O_5-H_2O$, CaO-$P_2O_5-H_2O$-HA (HA: HCl, $HNO_3$, $H_2SO_4$) was carried out. The conditions of the preparation of mono-, dicalcium phosphate and mixtures by crystallization and separation of the crystals from the mother liquid which is circulated during the stage of phosphate rock acid decomposition, were found. The equilibrium study of these systems, which had technological admixtures (MgO, $R_2O_3$), the chemism and kinetics of the interaction of the phosphate rock with the mixture of the phosphoric acid and mother liquor and calcium phosphate crystallization were investigated. This investigation made it possible to work out the scheme of the process with liquid recycle for the production of calcium phosphonates. According to this scheme, phosphate rock is processed by phosphoric acid and mother liquid mixture at 40-80°C for 30-60 min. As the liquid phase has a high activity, the yield of the phosphate rock decomposition achieves 98-100%. Monocalcium phosphate formed with insoluble mixtures or pure monocalcium phosphate is separeted by crystallization and filtration after preliminary separation of mixtures (1). The process with recycle was tested in laboratory using various natural phosphate rocks with a range of $P_2O_5$ content within 14,5-39,4%. The product (monocalcium phosphate contains 26-54% $P_2O_5$, depending on the quality of the phosphate rock and the process organization. The amount of $P_2O_5$ extraction from the phosphate was nearly quantitative in all cases.

(1) E.Jahontova, I.Petropavlovsky, V.Karmichov, I.Spiridonova, Acid methods of the phosphate rock refining, Chemistry, 287 (1988).