Speciation Diagrams in Some Metal Ions- H_3PO_4 System

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There are no substitutes for phosphate rocks as raw materials in the production of phosphate fertilizers and phosphoric acid. We reviewed 222 published articles on purification in which approximately 75% of the studies corresponded to methods of extraction with solvents, methods of precipitation and methods of adsorption. It was estimated that 75-80% of the trace elements present in rocks are not eliminated during the production of phosphoric acid but must be eliminated to obtain purified acid for human use. Speciation diagrams showing that the formation of dimers limits the electrochemical process are presented. Knowledge of the electrical conductivity of phosphoric acid is essential in electrochemistry, and three regions were identified: 1) concentrations lower than 1 mol L^{-1} , where the low conductivity is due to the low concentration of ions; 2) concentrations between 1 mol L^{-1} and 6 mol L^{-1} , where there are more ions and the water-phosphate and phosphate-water-phosphate interactions increase; 3) concentrations higher than 6 mol L^{-1} , where the phosphate-water-phosphate interactions increase further, producing a higher viscosity and greater formation of dimers; consequently, the conductivity decreases and the formation of dimers limits the electrochemical process. Therefore, it is suggested to operate in the second region.

Keywords: Phosphoric acid, Species, Predominance diagrams.

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