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The influence of polyphosphonates on the precipitation of strontium sulfate (celestite) from aqueous solutions

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ABSTRACT

The precipitation of strontium sulfate in 0.7 mol l^{-1} sodium chloride solutions was investigated at various degrees of supersaturation (0.2–0.62), with pH = 7.5, at 25°C. The rate of precipitation showed a quadratic dependence upon the relative degree of supersaturation which suggests a surface-controlled mechanism. The presence of phosphonates even at relatively low concentrations (2.5–20 × 10^{-6} mol l^{-1}) was retarding the rate of precipitation. This retardation effect was enhanced with the increase in concentration of the additives. Moreover, the retardation further augmented as the relative degree of supersaturation was decreased. The effect of the additives has been attributed to the blocking of active sites by adsorption of the additive molecules on the crystal precipitation surfaces. The action of the additives can be interpreted in terms of a Langmuir-type adsorption isotherm.

Keywords: Precipitation; Strontium sulfate; Polyphosphonate; Aqueous solutions

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