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Silver Removal from Aqueous Solution by Adsorption on Concrete Particles

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Abstract: The ability of concrete to remove silver from its aqueous solutions was studied. Silver removal is favored by low concentration and high pH at room temperature. The intrinsic acidity constants, average pK_{a1}^{int} and average pK_{a2}^{int} were determined. The calculated pH_{PZC} (5.4) is in agreement with the pH_{PZC} values determined from zeta potential measurements, indicating that the concrete particulate behaves amphoterically. The total acidity capacity for the negative and positive surface was 0.5 $\mu C/cm^2$. A surface complex formation model (SCFM) was used to describe the adsorption of silver onto concrete particles. In general the equilibrium constants, the pK_S^i values, decrease as the silver loadings increase.

Key Words: Concrete, Equilibrium constants, Intrinsic acidity constants, Silver adsorption, Surface acidity