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Treatment mechanism of chromium-containing wastewater with carbonate minerals

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ABSTRACT

The pH scope for neutralization precipitation of chromium ion is comparatively narrow (6.3 ~ 9.5) and the dosage must be controlled strictly when NaOH or CaO is used as regulator. Slight dissolution of carbonate minerals such as calcite ($CaCO_3$) and magnesite ($MgCO_3$) makes it possible that the solution has buffer pH which can match with the condition of neutralization precipitation of chromium ion. The hydroxide precipitation of Cr(III) occurs more easily in the interface area than in solution because the interfacial solubility product of $Cr(OH)_3$ formed on the surface of $MgCO_3$ ($K^s_{SP} = 10^{-33.50}$) is less than the solubility product in solution ($K_{SP} = 10^{-30.27}$). After the surface precipitation is formed, the dynamic electricity behavior of $MgCO_3$ becomes similar to that of $Cr(OH)_3$. Using $MgCO_3$ as a purifier, the wastewater containing high concentration of chromium ion has been purified and advantages such as good purification effect, fast subsiding speed, and little sediment volume are manifested.

Keywords: Carbonate mineral; Chromium ion; Wastewater treatment

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