



Chloride removal from industrial cooling water using a two-stage ultra-high lime with aluminum process

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ABSTRACT

This study evaluates the feasibility of chloride removal from industrial cooling water using a two-stage ultra-high lime with aluminum (UHLA) process. This two-stage UHLA process was employed to treat recycled cooling water collected from an industrial plant containing high concentrations of carbonate ions and suspended solids. The presence of anions such as carbonate and bicarbonate limits the removal of the desired ions, namely sulfate and chloride ions. The two-stage UHLA process was used in which lime is added at the first stage to remove carbonate ions, and both lime and sodium aluminate are added at the second stage to remove chloride and sulfate ions. Experimental results showed that chloride removal can be achieved at reasonable lime and sodium aluminate dosages. The results of equilibrium experiments indicate that the most cost-effective performance in the two-stage configuration occurred with lime dosages in the first and second stages equal to 50 mM and an aluminum dosage equal to 30 mM. These dosages achieved a 56% chloride removal.

Keywords: Chloride removal; Cooling water; Industrial wastewater; Recycling; Softening

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