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Study on a Removal Mechanism for Residual Chlorine by Copper Fiber

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Abstract:

We examined a removal effect and a removal mechanism of residual chlorine by copper fiber made from copper sticks. A copper fiber of 1.0 g could remove residual chlorine of about 1.0 mg/L (100 mL) for 60 min. However, the removal effects by copper board, copper line, copper eluate, copper sulfate solution and copper nitrate solution were low. Furthermore, because the removal effects were depressed by addition of bathocuproine which is a chelating agent of copper (I) ion or DMPO (5, 5-dimethyl-1-pyrroline-N-oxide) which is a spin trapping agent of radical species, it was presumed that an active substance, such as radical species which might be formed from dissolved oxygen in case of changing from copper (I) ion to copper (II) ion, decomposed residual chlorine. Practically, when chemiluminescence by luminol was measured, the chemiluminescence from a test of copper fiber was detected more than from the test of copper sulfate solution. Furthermore, when the removal effect in sodium hypochlorite solution prepared with degassed purified water was tested, the removal effect was depressed. Therefore, it was presumed that radical species were formed from copper and dissolved oxygen in the water. With regard to the mechanism of the removal effect by copper fiber, it was shown that active radical species, which formed from copper and dissolved oxygen in for copper (I) ion changing to copper (II) ion, partially decomposed residual chlorine.

Key words: [copper fiber](#), [copper](#), [residual chlorine](#), [radical species](#), [water treatment](#)

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