Wool micro powder as a metal ion exchanger for the removal of copper and zinc

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ABSTRACT

Waste wool fibers (WF) were oxidized and ball milled to enhance the exchanging ability toward some metal ions, namely copper and zinc. Wool fibers were oxidized with hydrogen peroxide and tetra acetyl ethylene diamine, followed by grinding process. Optimization of the exchanging medium with regard to the metal ion concentration, pH, and exchanging time was performed. It was observed that the ability of the wool powder (WP) and oxidized wool powder (OWP) to exchange greater amount of metal ions than the ordinary waste wool fibers. Mostly, current results verify a significant ability of the OWP to exchange copper and zinc ions from their aqueous medium. Nevertheless, the ability of all wool substrates used to exchange copper is more than their ability to exchange zinc, and as the pH of the exchanging medium increases, the uptake % of both copper and zinc ions by WF or WP increases to reach its maximum at pH 6. The efficiency of WF, WP, or OWP to adsorb copper and zinc ions after a number of adsorption/desorption tests was also studied.

Keywords: Wool powder; Ion exchanger; Wool waste; Metal ions; Copper; Zinc

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