

High -rate removal of Cd(II) using surface activated waste Lyocell fiber adsorbents in comparison with Dowex Mac -3 resin

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High -rate Cd(II) removing adsorbent fibers were developed by activating the surfaces of textile waste Lyocell strands (CMC -LS) and Lyocell fabrics (CMC -LF) through carboxymethylation and cross -linking reactions. Dowex Mac -3 resin (DM3) was used as a commercial comparator. The nature of raw material and development processes were found to be contributing factors to the performance of the sorbents, and initial metal concentration influenced the adsorption rates. The CMC -LS sorbent exhibited very fast adsorption kinetics within 1 -5 mins at three different initial concentrations and its affinity toward the Cd(II) ions was much higher than the resin. The adsorption rates of DM3 and CMC -LF were similar but DM3 had the highest uptake. CMC -LF could not apply to column due to some agglomeration after preparation while CMC -LS and DM3 could be used in a column. In the column, the uptake of Cd(II) by CMC -LS was about 70% of its maximum capacity but that by DM3 was just about 57%. Hence, the adsorbents could be very useful in treating Cd(II) -bearing solutions within very short times.