

MODELLING MIXED BED ION EXCHANGE KINETICS FOR REMOVAL OF TRACE LEVELS OF DIVALENT CATIONS IN ULTRAPURE WATER

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ABSTRACT

Laboratory column testing was performed to simulate the collection of divalent metallic corrosion products. The purpose of the testing was to determine mass transfer coefficients for metallic cation concentrations typical of corrosion products in ultrapure water (ppb levels). The experimental apparatus consisted of three supply columns containing cation resin converted to iron, nickel, and cobalt forms, respectively, and a collection column containing stoichiometrically equivalent amounts of mixed cation and anion resin. After six months of continuous operation, the cleanup column resin bed was sanctioned, and linear regression was performed on the resin profile data for each ionic constituent to obtain best-fit values for mass transfer coefficient and effective ionic diffusivity.