Preparation, characterization and Pd(II) adsorption characteristics of chitosan–AC composites from electroless plating solutions

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\textbf{ABSTRACT}

This study targets the comparative efficacy of impregnated and cross-linked chitosan–activated carbon composite adsorbents for Pd(II) adsorption from Ethylenediaminetetraacetic acid (EDTA)-containing electroless plating (ELP) solutions. Specific novelty of the addressed research in the article corresponds to adsorption and desorption characteristics of said adsorbents for Pd(II) recovery from synthetic ELP solutions that can be characterized to have complex solution chemistry than aqueous solutions. The Brunauer–Emmett–Teller analyses indicated maximum surface area of cross-linked adsorbent (1,317 m\textsuperscript{2}·g\textsuperscript{−1}). The adsorbent provided a highest capacity (8.08–70.14 mg·g\textsuperscript{−1}) and removal percentage (84.17%–97.04%) for variant Pd(II) solution concentration. For ELP solutions, the monolayer Pd(II) adsorption capacities are maximum (90.91/95.6 mg·g\textsuperscript{−1}) for cross-linked chitosan AC adsorbent. These findings infer that Pd(II)-adsorbed chitosan cross-linked activated carbon can be developed as waste to value product for low temperature catalysis applications.

\textit{Keywords:} Pd(II) adsorption; Electroless plating solution; EDTA; Chitosan; Activated carbon

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