

## Kinetics and mechanism of Cu<sup>2+</sup> ions adsorption on PEGylated-citric acid-based hydrogel

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### ABSTRACT

In view of the critical concern for the toxic materials accumulation in environment, new materials synthesized from biocompatible feedstock are being investigated for purification technologies. In the present study we report a new hydrogel as adsorbent for Cu<sup>2+</sup> ions under the simulated conditions. Citric acid (CA) was reacted with poly(ethylene glycol) [PEG] via the lipase catalyzed reaction. The PEGylated-CA was characterized with SEM, <sup>1</sup>H-NMR and FTIR spectroscopy and evaluated as an adsorbent of Cu<sup>2+</sup> ions by variation of adsorption conditions with respect to time, temperature, solution pH and ion concentration. Subsequently, the maximum retention capacity (172.3 g/mg up to five feeds) was evaluated under the optimal adsorption conditions. The material is reusable and reusability studies were carried out up to 10 feeds.

*Keywords:* PEGylatedCA; Water pollution; Maximum adsorption capacity; Langmuir isotherm; Pseudo-second order kinetics

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