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Kinetic and Thermodynamic Modified Pectin with Chitosan by Forming Polyelectrolyte Complex Adsorbent to Remediate of Pb(II)

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Abstract : Biosorbent, such as pectin and chitosan, are usually produced with low physical stability, thus the materials need to be modified. In this research, the physical characteristic of adsorbent was increased by grafting chitosan using acetate carboxymetyl chitosan (CC). Further, CC and Pectin (Pec) were crosslinked using cross-linking agent BADGE (bis phenol A diglycidyl ether) to get CC-Pec-BADGE (CPB) adsorbent. The cross-linking processes aim to form stable structure and resistance on acidic media. Furthermore, in order to increase the adsorption capacity in removing Pb(II), the adsorbent was added with NaCl to form macroporous adsorbent named CCPec-BADGE-Na (CPB-Na). The physical and chemical characteristics of the porogenic adsorbent structure were characterized by scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FT-IR). The adsorption parameter of CPB-Na to adsorb Pb(II) ion was determined. The kinetics and thermodynamics of the bath sorption of Pb(II) on CPB-Na adsorbent and using chitosan and pectin as a comparison were also studied. The results showed that the CPB-Na biosorbent was stable on acidic media. It had a rough and porous surface area, increased and gave higher sorption capacity for removal of Pb(II) ion. The CPB-Na 1/1 and 1/3 adsorbent adsorbed Pb(II) with adsorption capacity of 45.48 mg/g and 45.97 mg/g respectively, whereas pectin and chitosan were of 39.20 mg /g and 24.67 mg /g respectively.

Keywords : porogen, Pectin, Carboxymethyl Chitosan (CC), CC- Pec-BADGE-Na
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