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## ICONTES

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## **Correlation Between Cavity Fraction of Cu<sup>2+</sup> Ionic Imprinting and Concentration of H<sup>+</sup> Ion on Amino-silica Hybrid to Cu<sup>2+</sup> Ion Adsorption**

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### **Abstract:**

It has been studied the correlation between cavity fraction of Cu<sup>2+</sup> ionic imprinting and concentration of H<sup>+</sup> ion in solution media upon adsorbent ability of amino-silica hybrid of Cu<sup>2+</sup> ionic imprinting (Cu(II)-IIP) in adsorbing Cu<sup>2+</sup> ions in solution. In order to identify the active sites playing a role upon Cu<sup>2+</sup> ion adsorption, identification of functional groups, surface morphology, element compositions, surface area, volume, and porous diameter of adsorbent were investigated in this experiment. The interaction between Cu(II)-IIP and Cu(II) ion was evaluated with a kinetic model and an adsorption isotherm to determine the adsorption rate, adsorption isotherm model, and adsorption capacity value. Adsorption process was performed using batch method with interacting Cu(II)-IIP adsorbent with each cavity fraction of ionic imprinting of Cu(II)-IIP-1; Cu(II)-IIP-2; Cu(II)-IIP-3; and Cu(II)-IIP-4 of 97.69; 98.75; 97.87; 96.89 % in solution media with each concentration of H<sup>+</sup> ion of 0.5; 1.0; 1.5; 2.5; 5.0 mmol L<sup>-1</sup>, respectively. The adsorption data obtained showed that Cu(II)-IIP with different ionic imprinting fractions gave relatively similar adsorption models, the higher the concentration of H<sup>+</sup> ion in solution media, the lower the concentration of Cu<sup>2+</sup> ion adsorbed on the Cu(II)-IIP adsorbent. From the evaluation results of the adsorption kinetic and adsorption isotherm parameters show that the values of the adsorption rate and capacity of ionic imprinted materials on Cu(II)-IIP-1; Cu(II)-IIP-2; Cu(II)-IIP-3; and Cu(II)-IIP-4 are bigger than non-imprinted polymer (NIP). The Cd<sup>2+</sup> ionic imprinting cavity fraction played a role as active sites prepared from different concentrations of Cu<sup>2+</sup> ion produces different adsorption rate and capacity upon ion target (Cu<sup>2+</sup> ion). Adsorption competition of Cu<sup>2+</sup> and H<sup>+</sup> ion toward active sites is influential to number of Cu<sup>2+</sup> ion adsorbed on NIP and Cu(II)-IIP. The higher the concentration of H<sup>+</sup> ion, the lower the number of Cu<sup>2+</sup> ion adsorbed. The Cu<sup>2+</sup> ionic imprinted material from amino-silica hybrid can be used as effective material to bind Cu<sup>2+</sup> ion in solution.

**Keywords:** adsorption active site, amino-silica hybrid, imprinted ionic.