Effective recovery of AuCl$_4^-$ using thiosemicarbazide and thiocarbohydrazide functionalized D301 resin

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Received 25 July 2018; Accepted 1 January 2019

ABSTRACT

In this study, two novel adsorbents (TSCD301 and TCHD301) were successfully synthesized through ring-opening reaction between the amino of thiosemicarbazide or thiocarbohydrazide and the epoxy group of poly(glycidyl methacrylate). The adsorption performance and recognition selectivity of TCHD301 and TSCD301 toward AuCl$_4^-$ were studied by batch adsorption experiments. The results showed that the equilibrium adsorption capacity of TSCD301 and TCHD301 toward AuCl$_4^-$ could reach 410.76 and 566.59 mg·g$^{-1}$ at 298 K and pH of 2, respectively. The adsorption process could be described using the pseudo-second-order model, and the adsorption behavior of AuCl$_4^-$ on TSCD301 and TCHD301 was typical monolayer adsorption. In mixed solution, two adsorbents had excellent selectivity toward AuCl$_4^-$.

Keywords: D301 resin; Modification; AuCl$_4^-$; Adsorption; Selectivity

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