

Development of thermo-responsive polymer brush adsorbent for selective recovery of gold (Au^{3+}) ions from e-waste leachates

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A gold-selective (Au^{3+}) thermo-responsive adsorbent ($\text{p(NIPAM-co-15TCE4)@SiO}_2$) was fabricated via ATRP method. The adsorbent is capable of adsorbing/releasing Au^{3+} reversibly by varying the solution temperature below and above its phase transition point. Adsorption results reveal competitive and selective Au^{3+} uptake of $\text{p(NIPAM-co-15TCE4)@SiO}_2$ with $K_D \sim 3112 \text{ mL g}^{-1}$. The minimal reagent requirement for Au^{3+} stripping makes the desorption step a green process. Overall results indicate the potential of $\text{p(NIPAM-co-15TCE4)@SiO}_2$ as a selective and green adsorbent for Au^{3+} . This study was supported by NRF funded by The Ministry of Science and ICT (2017R1A2B2002109 and 2020R1A2C1003560), Ministry of Education (2020R1A6A1A03038817), and by KETEP funded by the Ministry of Trade, Industry & Energy (MOTIE No. 20194010201750).

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