Development of polysulfone-biomass composite sorbents for recovery of precious metals from acidic solution

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In this study, polyethyleneimine (PEI)-coated polysulfone-*Escherichia coli* biomass composite fiber (PEI-PSBF) was prepared by spinning biomass-polysulfone blends into water, coating with PEI and cross-linking. The PEI-PSBF was stable in acidic solutions (0.1M and 1M HCl). The maximum Pt(Ⅳ) uptake of PEI-PSBF was enhanced 6.6 times. The pH in the PEI coating was a key factor affecting the sorption performance of PEI-PSBFs. The optimum pH for coating was around pH 9. The pH for the maximum electrostatic attraction between PEI and biomass was calculated to be pH 9.2 which was similar to experimentally observed optimum pH. Furthermore, an enhanced PEI-coating efficiency was achieved by removing the electrostatic repulsion through succination of amine groups on the biomass. The PEI-PSBF showed the Pd(Ⅱ) selectivity in Pd(Ⅱ)-Pt(Ⅳ) bimetal solutions. Based on the selective binding property, the selective separation of Pt(Ⅳ) and Pd(Ⅱ) was achieved by chromatography method with PEI-PSBF.