Liquid-liquid extraction for highly selective separation of Pd and Pt from secondary waste using novel thiacrown ether derivatives

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Engineered thiacrown ethers designed to have superior selectivity towards either palladium or platinum were applied to liquid-liquid extraction to verify their selectivity properties. These thiacrown ethers were methylated to increase solubility towards toluene prior to extraction studies. The effects of HCl and thiacrown ethers concentration to the distribution factors of Pd and Pt were performed subsequently to determine the optimum HCl concentrations, metal-extractant coordination ratios, and extraction equilibrium coefficients. Finally, the thiacrown ethers which have the highest Pd or Pt selectivity were then separately used to recover Pd or Pt in simulated spent automotive catalyst leach solutions. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (No. 2009-0093816 and 2017R1D1A1B03028102).