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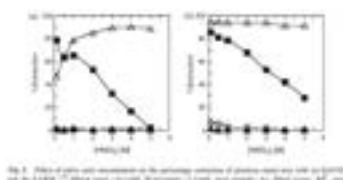
SEPARATION TECHNIQUES

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Preparation of a novel dibenzylamide derivative of p-tert-Octylcalix[4]arene and investigation its solvent extraction behavior of precious metal ions

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Precious metals, including Ag, Au, and the six platinum group metals (PGMs), possess specific properties and have been extensively applied for decades in many industrial fields, e.g. as catalysts and conductor, due to their specific properties. In the automotive industry, other metals cannot replace palladium, used as a catalyst. Palladium demand projections show a significant increase in the use of these metals for current automotive technology and the development of fuel cell vehicles. However, the separation and purification of PGMs from leachates is usually difficult because of their similar nature and chemical behavior. Thus, efficient approaches for the recovery and separation of precious metal ions have been explored. The solvent extraction process is one of the most versatile methods used for the removal, separation, and concentration of metal species from mixed metal aqueous media. Extensive work on the extractive separation of PGMs with macrocyclic compounds has been carried out, including the use of calixarenes. Calixarenes are phenolic cyclic host oligomers and have been attached much attention due to their specific structure for metal separation. In this work, a novel dibenzylamide derivative of p-tert-octylcalix[4]arene was synthesized to investigate its solvent extraction properties towards precious metal ions. Amide derivatives of calix[4]arenes (Fig.1.), BATOC, EATOC, exhibited silver selectivity over the divalent palladium ion. Both amido-type extraction reagents, BATOC, EATOC, extracted silver over the whole nitric acid concentration range, whereas the extraction percentage of palladium decreased gradually at a higher nitric acid concentration because of the increase of the protonated coordinating carbonyl oxygen atoms (Fig.2). The placement of optimal substituents on the amide group can improve the silver selectivity over palladium and trace amounts of silver ions can be removed in the presence of a large amount of coexisting palladium.



Biography

Jee Young Kim has received her BS degree in Chemistry from Kosin University, Busan, South Korea in 2003, MS degree in Inorganic Chemistry from Kosin University, Busan, South Korea in 2005 and completed PhD course in Nanomaterial Chemistry from Pusan National University, Busan, South Korea in 2010. She has received her PhD degree in Chemical Engineering from Saga University, Saga, Japan in 2015. Her research interest interfacial behavior and solvent extraction kinetics with various types calix[4]arene derivatives. Moreover, recent work focuses on the Coordination Polymer, MOFs, and so on.

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