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Design and evaluation of new ligands with high extractability and selectivity for palladium from secondary raw material

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Recovery and separation of palladium from their aqueous waste solutions is one of the most important subject from economic and environment viewpoints. In fact, palladium is a very rare metal in the Earth's crust, the worldwide reserves being localized in very few countries. Therefore, the amount of palladium that can be recovered from the so-called secondary resources, that is, recycling of catalytic converters and electronic scrap, is very important. For this purpose, many ligands have been developed and used during the last decades. These ligands have many limitations (e.g. slow kinetic, poor solubility and instability in acidic medium etc. To overcome the situation, it becomes imperative to look for other classes of extractants. Within this context, the present study focusing on using N,N,N',N'-tetra-substituted dithiodiglycolamide derivatives as a novel and promising solvent extraction reagents to mainly perform the separation of Pd from other PGMs and from some commonly associated elements contained in concentrated hydrochloric acid. Liquid–liquid batch extraction studies were investigated to understand the influence of various parameters on the extraction behavior of palladium. They showed great extractability and selectivity for palladium than the other investigated metal ions, which showed negligible extraction values. On the other hand, the novel ligands could be a potential candidate for separation and recovery of palladium from spent catalyst dissolver (SSCD) solution.

Biography

Emad Mowafy has expertise in Solvent Extraction Technology. He designed, developed and evaluated many novels organic and inorganic ion exchanger advanced materials for selective recovery and separation of economic and strategic elements from their aqueous waste solutions. Most of these new designed extractants can be utilized in different industrial fields. These new designed reagents have many advantages (speed kinetic, high stability, selectivity and solubility in organic diluents) compared with most commercial ligands.

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