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Recovery of precious metals by means of adsorption using microalgal waste

Novel environmentally benign adsorbent was prepared from waste residue of microalgae after extracting biodiesel oil by a simple manner of treating in concentrated sulfuric acid at high temperature. Although the feed material, the microalgal waste itself, was found to selectively adsorb gold(III), palladium(II) and platinum(IV) from hydrochloric acid solution over base metals such as copper(II), nickel(II) and so on, the adsorption of gold(III) was dramatically enhanced by the treatment using concentrated sulfuric acid; it was recovered as metallic gold particles. In order to improve the adsorption behavior for palladium(II) and platinum(IV), some chemically modified microalgal gels were also prepared by immobilizing some functional groups such as dithiooxamide, polyethyleneimine and trimethylamine. In addition to the basic investigation about the adsorption behaviors of these biosorbents, adsorptive recovery of precious metals was also investigated from actual leach liquor of printed circuit board of spent mobile phones using the chemically modified adsorbent in order to verify its effectiveness for practical application.

Biography

Katsutoshi Inoue has received Bachelor's degree from Kyushu University, Department of Organic Synthesis, Master's degree from the same university. He became a Lecturer of Saga University, Department of Applied Chemistry in 1971. He has completed his PhD degree from Kyushu University and became an Associate Professor of Saga University in 1974 and then became Full Professor of Saga University in 1986. He retired from Saga University and became a Professor Emeritus of the same university in 2009. His field is separation chemistry and technology such as adsorption, ion exchange and solvent extraction.

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