

ガラス固化体の高品質化・発生量低減のための白金族元素回収プロセスの開発 (11) チオジグリコールアミド系抽出剤と第三級アミンを用いた硝酸水溶液からの白金族元素抽出

Development of Recovery Process of Platinum-group Metals from HLLW for Stable Production and Volume Reduction of Homogeneous Vitrified Object

(11) Extraction of Platinum Group Metals from Nitric Acid Solutions Using Thiodiglycolamides (TDGA) and Tertiary Amines

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Synergistic extraction of Pd, Rh and Ru from highly concentrated nitric acid solutions was investigated using mixed solvents of newly synthesized thiodiglycolamide (TDGA) and tertiary amine compounds.

Keywords: solvent extraction, synergistic effect, platinum group metals, thiodiglycolamide, tertiary amine

1. Introduction In order to improve the vitrification process, the decrease in the concentration of platinum group metals (PGM) (especially, Pd, Rh and Ru) in HLLM is imperative. That requires new extraction system that can effectively extract PGM from highly concentrated HNO₃ solutions. We have been studying the

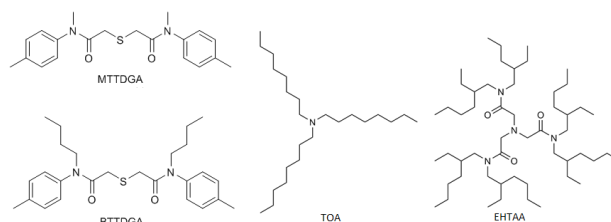


Fig. 1 Molecular structure of extractants

extraction of PGM from HCl and HNO₃ solutions with mixed solvents of TDGA and amine-type extractants [1]. In this study, we investigated that synergistic extraction of Pd, Rh and Ru from highly concentrated HNO₃ solutions with mixed solvents of newly synthesized TDGA (MTTDGA and BTDDGA) and tertiary amine-type extractants (TOA and EHTAA) (Fig. 1).

2. Experiments TOA (Wako Chemicals) and EHTAA (Chemicrea) were used without further purification. MTTDGA and BTDDGA were synthesized by the procedure described in our previous paper [2]. The extraction operation was carried out batchwise: the extractants diluted in toluene for organic phase, Pd(II), Rh(III) and Ru(III) in 8 M HNO₃ for the aqueous phase. Both of MTTDGA and BTDDGA extracted about 100% Pd(II) without TOA or EHTAA, although they hardly extracted Rh(III) and Ru(III). Similarly, Rh(III) and Ru(III) were not extracted in the TOA and EHTAA systems. However, using the mixed solvents (MTTDGA or BTDDGA and TOA or EHTAA) largely enhanced extraction efficiencies of Rh(III) and Ru(III).

3. Conclusion As for Pd(II), TDGA can quantitatively extract Pd(II) without TOA or EHTAA. A synergistic effect for Rh(III) and Ru(III) extraction occurs in the TDGA–TOA and TDGA–EHTAA systems.

References

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