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堆积模型在萃取中的应用**I:** 水相介质协同效应

李醒夫,唐柏军,孙鹏年

中国科学院高能物理研究所;中国科学技术大学生物系

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摘要 根据推积模型提出一种新的协萃体系,即:(简单阴离子)1+(简单阴离子)2+萃取剂,
并以实验证实了水相混合介质的协同效应.研究了UO2/OAc,C1/TBP-二甲苯体系的协萃效应,
测定了萃合物的组成以及各种影响分配比的因素.

关键词 浓度 铀酰化合物 磷酸三丁酯 萃取 氯离子 协同效应 平衡常数 空间效应 乙酸 P 协同萃取 萃取机理 堆积模型

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Application of cone packing model in extraction I: Synergistic effect in mixed substrates extraction

LI XINGFU,TANG BONIAN,SUN PENGNIAN

Abstract Synergistic effects in ternary substrate1 + substrate2 + extractant systems are illustrated by the extration of uranyl ion from mixed acetate and chloride solns. According to the cone packing model, ligand packing around the uranyl equatorial plane should be neither overcrowded nor undercrowded. The sum of the ligand fan angle (FA) around the uranyl equatorial plane provides a useful criterion for estimating steric crowding. While FA of UO2(OAc)2(TBP)2, UO2(OAc)2TBP, UO2Cl2(TBP)2 and UO2Cl2(TBP)3 are 204, 164, 164, and 203? resp., none favors formation of stable extracted complexes. The FA of UO2(OAc)Cl(TBP)2 is 184?indicating the most favorable packing. The synergistic effect based on the formation of the extracted complex UO2(OAc)Cl(TBP)2 in mixed acetate and chloride solution was predicted. The prediction was confirmed by extration of uranyl ion from solns. containing NaOAc-HOAc and NH4Cl. At constant total concentration of solution, synergistic extration occurs at 1:3 acetate to chloride ratio which shifts a little on changing the concentration of the uranyl ion from 3.97 ?10-4 to 2.06 ?10-2 M. The extracted complex is mainly UO2(OAc)Cl(TBP)2 according to the slope method and an anal. of the uranyl and chloride concentration in the organic phase. Variation of the synergistic effect with pH was studied. A similar effect was found for other extractants and diluents.

Key words CONCENTRATION URANYL COMPOUNDS PHOSPHORIC ACID TRIBUTYL ESTER EXTRACTION CHLORINE ION SYNERGISTIC EFFECT EQUILIBRIUM CONSTANT STERIC EFFECT ACETIC ACID P SYNERGIC SOLVENT EXTRACTION EXTRACTION MECHANISM CONE PACKING MODEL

DOI:

通讯作者