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TBP-煤油体系中U(Ⅵ)的光化学还原以及在铀、钚分离上的应用

@张先业$中国原子能科学研究院!北京 @段云富$中国原子能科学研究院!北京 @周志宏$中国原子能科学研究院!北京 @胡景炘$中国原子能科学研究院!北京

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摘要 文章研究了30%TBP-煤油体系中U(VI)的光化学还原以及有机相中HNO_2含量、温度对光化学过程的影响,并测定了光化学反应后有机相对铀的保留量以及对裂片元素~(95)Zr-~(95)Nb,~(103)Ru和~(153)Gd的萃取性能的影响。按照Purex过程1 B柱工艺进行了光化学还原反萃分离钚的单级试验。结果表明,铀、钚分离效果是满意的,光化学反应对铀在有机相中的保留和对裂片元素的净化没有明显影响。

关键词 U(VI)光化学还原 铀-钚分离 铀保留

分类号

PHOTOREDUCTION OF U(Ⅵ) IN TBP-KEROSENE SOLUTION AND ITS APPLICATION OF SEPARATING Pu FROM U

ZHANG XIANYE;DUAN YUNFU;ZHOU ZHIHONG;HU JINGXIN China Institute of Atomic Energy, P. O. Box 275, Beijing

Abstract The effects of concentration of nitrous acid and temperature on photochemicalreduction of U(Ⅵ) to U(Ⅳ) in 30% TBP-terosene are studied. The retention ofuranium in organic phase, which is irradiated by gallium-lamp, is determined. Theresults show that the concentration of DBP-MBP and nitrous acid increase withirradiation time, and the retention of uranium is caused by DBP-MBP. The extra-ction behavior of Zr-Nb, Ru and Gd with 30% TBP-kerosene irradiated is inve-stigated. It is found that distribution ratios of Zr-Nb in extraction increase with inc-rease of irradiation time, no effects for Ru and Gd are observed. After irradiating30% TBP-kerosene loaded uranium and plutonium with gallium lamp, the U(VI) isreducted to U(Ⅳ), then Pu(Ⅳ) is reducted to Pu(Ⅲ) by U(Ⅳ) in organic phase.According to the condition of 1B column in Purex process, stripping plutoniumfrom uranium in organic phase is satisfactory, no effects for retention of uranium and decontamination factors for fission products are observed.

Key words Photochemical reduction of U(Ⅵ) Separation of plutonium from uranium Retention of uranium

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