

Recent developments in studies on separation process in order to obtain nuclear grade dysprosium oxide

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ABSTRACT

Separation of nuclear grade dysprosium oxide is a technically challenging task. The separation process adopted is dual cycle counter current solvent extraction. The extractant is 2-ethyl hexyl phosphonic acid mono-2-ethyl hexyl ester (EHEHPA). Scrubbing is incorporated to enhance the separation performance of the cascade before the stripping operation. A 54 stage mixer-settler cascade was operated in dual cycle mode. In the first cycle, Y, Ho and Er were separated from Dy and lighter rare earths (LRE) and in the second cycle, Gd and Tb were separated from Dy. Salient separation results including material balance are presented in this paper. Results show that high purity product analyzing $Dy_2O_3 > 97\%$, $Gd_2O_3 < 0.2\%$, $Tb_4O_7 \leq 1\%$ and $Y_2O_3 < 1\%$ is obtained, as required for nuclear reactor application.

Keywords: Separation; Solvent extraction; Dysprosium oxide; AHWR

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