

用DHDECMP在逆流色谱上分离镧系金属离子

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摘要 用DHDECMP(二己基-N,N-二乙基甲酰胺基亚甲基膦酸酯)的环己烷溶液作为固定相,硝酸溶液作为流动相,在逆流色谱上进行了镧系金属离子 Ce^{3+} , Nd^{3+} , Sm^{3+} , Gd^{3+} , Tb^{3+} , Dy^{3+} , Er^{3+} , Yb^{3+} 和 Lu^{3+} 的相互分离研究。逆流色谱分离金属离子与分离有机物不同,保留体积不仅取决于静态分配比,还取决于萃取反应的机理。由逆流色谱得到的动态分配比和静态分配比成良好的线性关系,但并不相等,这一实验结果验证了有关理论研究结果。

关键词 [逆流色谱](#) [保留体积](#) [镧系金属](#) [膦酸酯类](#) [环己烷](#)

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Separation of metal ions by countercurrent chromatography using dihexyl-N,N-diethylcarbamoyl methylene phosphonate

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Abstract In the present work, the batch distribution ratios of 9 lanthanide ions, Ce^{3+} , Nd^{3+} , Sm^{3+} , Gd^{3+} , Tb^{3+} , Dy^{3+} , Er^{3+} , Yb^{3+} and Lu^{3+} , are measured by countercurrent chromatography (CCC) with 25% DHDECMP (dihexyl-N,N-diethylcarbamoylmethylene phosphonate) in cyclohexane as the stationary phase and 3.35 mol/L HNO_3 as the mobile phase. Although perfect separation of the lanthanide ions using this system is impossible, heavy and light lanthanides can be grouped. The light lanthanides are better separated from each other. The interested metals can be nearly completely recovered. The dynamic distribution coefficients (D^d) obtained from the chromatogram are not equal to but proportional to the batch distribution coefficients (D^b), although the D^d is often equal to D^b in the separation of organic solute. This discrepancy is attributed to that the mechanism of the separation of metal ions by CCC is different from that of the organic solute. The results are consistent with the theoretical predictions, indicating that CCC deserves to be explored as a method for investigating the mechanism of the extraction reactions.

Key words [COUNTER-CURRENT CHROMATOGRAPHY](#) [RETENTION VOLUME](#) [LANTHANIDE SERIES METALS](#) [PHOSPHONIC ACID ESTER](#) [CYCLOHEXANE](#)

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