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以氮气为介质扩散分离氮同位素的可行性研究

Abstract

As a stable isotope marker, nitrogen-15 isotope has a wide range of applications. To explore the separation methods of nitrogen-15 isotope, single-stage and fourth-order diffusion separation experiments were conducted, and cascade design was carried out based on the experimental results. Under existing experimental conditions, the single-stage concentration coefficient of nitrogen separation by gas diffusion method can reach 0.008 in single-stage experiments; The single-stage concentration coefficient in the four stage cascade can reach 0.007; Using natural nitrogen as raw material, high abundance nitrogen isotopes can be prepared through two cascade steps. This study demonstrates the feasibility of using nitrogen as a medium to separate nitrogen isotopes through gas diffusion.

Keywords

Nitrogen isotope; Nitrogen; Gas diffusion method; Squared-off cascade

摘要

氮-15 同位素作为稳定同位素标记物，具有十分广泛的应用场景，为探索氮-15 同位素的分离方法，开展单级及四级扩散分离实验，并在实验基础上开展级联设计。在现有实验条件下，气体扩散法分离氮气在单级实验中的单级浓缩系数可以达到 0.008；四级级联中的单级浓缩系数可以达到 0.007；以天然氮气为原料，通过两次阶梯级联可以制备高丰度氮同位素。本研究证明了使用氮气为介质通过气体扩散法分离氮同位素的可行性。

关键词

氮同位素；氮气；气体扩散法；阶梯级联

Author: 王, 飞

Presenter: 王, 飞

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