

化学

多柱互联低温精馏分离H₂/HD过程理论研究

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摘要 在氢同位素分离中, 通常采用多柱级联工艺实现微量氘或氚的浓集。文章提出了三柱级联分离H₂/HD的设计工艺和操作模式, 获得了3根精馏柱的分离行为。在合适的操作模式下, 三柱级联将HD浓缩了20×10×10倍, 表明采用多柱级联可非常有效地浓缩微量组分。进一步研究了压力和回流比等因素对分离性能的影响。压力从0.06 MPa增加到0.15 MPa, 脱氘率从99.79%降到99.44%。回流比从3增长到5, 脱氘率从99.67%升到99.81%。

关键词 [低温精馏](#) [氢同位素分离](#) [多柱级联](#)

分类号

Theoretical Study on Separation of H₂/HD by Multi-column Interlinking Cryogenic Distillation

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Abstract Multi-column interlinking is an effective separation method adopted for enrichment of trace deuterium and tritium. Conceptual design and proper operating mode were proposed for separation of H₂/HD by cryogenic distillation with three interlinking columns, and separation performance was obtained. Enrichment of 20×10×10 achieved with proper operating mode indicates that multi-column interlinking is specially suitable for trace composition enrichment. The effects of pressure and reflux ratio on separation performance were also investigated. As pressure increases from 0.06 MPa to 0.15 MPa, deuterium stripping efficiency drops from 99.79% to 99.44%, and as reflux ratio increases from 3 to 5, deuterium stripping efficiency increases from 99.67% to 99.81%.

Key words [cryogenic](#) [distillation](#) [hydrogen](#) [isotopes](#) [separation](#) [multi-column](#) [interlinking](#)

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