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研究报告

# 低温精馏分离$H_2$/HD

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摘要 以天然氢为原料的第一次实验，总理论塔板数在20左右，以氘丰度为$1.0\times10^{-3}$的原料气进行的第二次实验，总理论塔板数为24，理论等板高度在15~20 cm。实验表明，在总理论塔板数较小时，冷凝器中氘丰度将随时间增长，再沸器中氘丰度变化实验值与理论值吻合很好，但同时观察到实验过程中液氢液位、温度等运行参数存在扰动。

关键词 氢同位素分离 低温精馏 理论模型

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# Separation Performance of $H_2$/HD by Cryogenic Distillation

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**Abstract** In order to study the behavior of hydrogen isotopes separation by cryogenic distillation, a computational method was constituted to obtain total stage number of distillation column based on experimental data and two separation tests were carried out with $H_2$/HD system. The total stage number is about 20 in the first test with natural hydrogen gas and is 24 in the second test with $1.0\times10^{-3}$ deuterium abundance hydrogen gas. The HETP value is in the range of 15- 20 cm. The experiments show that the deuterium concentration in the condenser will increase with time if the total stage number is small， and theoretical prediction of deuterium concentration in reboiler is agree very well with experimental value. The fluctuations of liquid hydrogen level and temperature are also observed during experiment.

**Key words** hydrogen isotopes separation _ cryogenic distillation _ theoretical model

DOI



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