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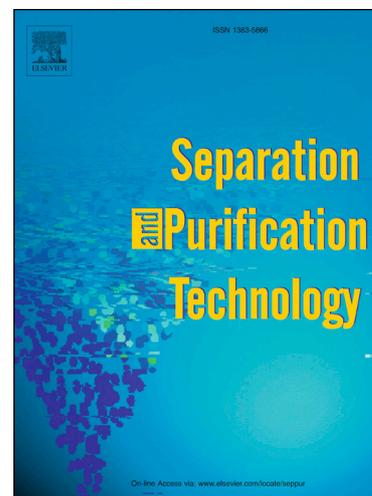
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Abstract

Helium is a key resource for many high-tech applications. The only feasible source of helium is natural gas, which can contain up to 2 % helium. These low helium concentrations demand efficient separation and purification processes to be economically feasible. However, the currently wide-spread low-temperature distillation is energy intensive and only applied at high helium concentrations. Instead of being used, lower helium concentrations are usually vented to the atmosphere. Here, we compare different process alternatives for helium recovery for two cases: A) A new natural gas plant is built B) an existing plant is retrofitted for helium recovery. Process simulations are conducted in Aspen Plus and are combined with an economical evaluation. The results show that membrane processes can well compete with thermal separation technologies even at low helium concentrations.

Introduction

Helium has unique physico-chemical properties, which make it an indispensable resource for a modern technological society. It is used in a wide variety of applications, as coolant for cryogenic

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