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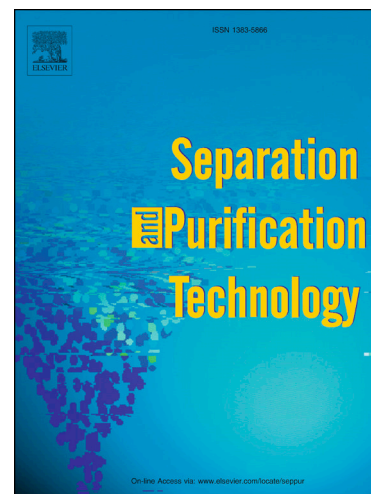
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# Asymmetric membrane structure: An efficient approach to enhance hydrogen separation performance

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**ABSTRACT:** Asymmetric membrane structure consisting thinner dense layer (decrease bulk diffusion resistance) and porous substrate (beneficial for the surface exchange) is an efficient approach to improve the hydrogen separation performance. Herein, the successfully prepared  $\text{La}_{5.5}\text{W}_{0.6}\text{Mo}_{0.4}\text{O}_{11.25-\delta}\text{F}_{0.05}$  (LWMF05) asymmetric membrane exhibited improved hydrogen permeability and enhanced stability compared to the symmetric membrane, which achieving a maximum values of  $0.16 \text{ mL}\cdot\text{min}^{-1}\cdot\text{cm}^{-2}$  at  $975 \text{ }^\circ\text{C}$ . The hydrogen permeation performance through the LWMF05 asymmetric membrane were investigated in detailed. And the influences of the asymmetric structure on interfacial processes during hydrogen separation were discussed, which verifies the predominance of the asymmetric structure.

**KEYWORDS:** Membrane; Mixed-conducting; Asymmetric; Hydrogen separation

## 1. Introduction

Hydrogen is one of the most crucial industrial raw materials for fossil fuel processing, production of

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