

# Supporting Information

## Green Synthesis of High-Performance CHA Zeolite Membranes in Pure K<sup>+</sup> Clear Solution

Chuncheng Li,<sup>a</sup> Zijian Zhang,<sup>a</sup> Chunwei Yang,<sup>a\*</sup> Pengfei Wang,<sup>a,b\*</sup>

<sup>a</sup> Shanghai Luqiang New Materials Co., Ltd, Shanghai, 201806, P. R. China

<sup>b</sup> State Key Laboratory of Polyolefins and Catalysis, Shanghai Research Institute of Chemical Industry  
CO., Ltd. Shanghai, 200062, P. R. China

\*Corresponding author: E-mail: [yang664686@163.com](mailto:yang664686@163.com); [wpf@sh-lq.com](mailto:wpf@sh-lq.com)

**Preparation of Synthetic Clear Solution:**

First, weigh 215.586 g of deionized water into a 500 mL beaker equipped with a magnetic stir bar. Then, weigh 5.504 g of  $\text{KAlO}_2$  solution and 4.321 g of KOH into the beaker. Stir continuously at 600 rpm throughout the process. Finally, weigh 11.015 g of colloidal silica and add it to the mixture using a dropper at a rate of one drop every 3 seconds. After completion of the addition, continue stirring for 2 hours to achieve aging.

**Figure S1**

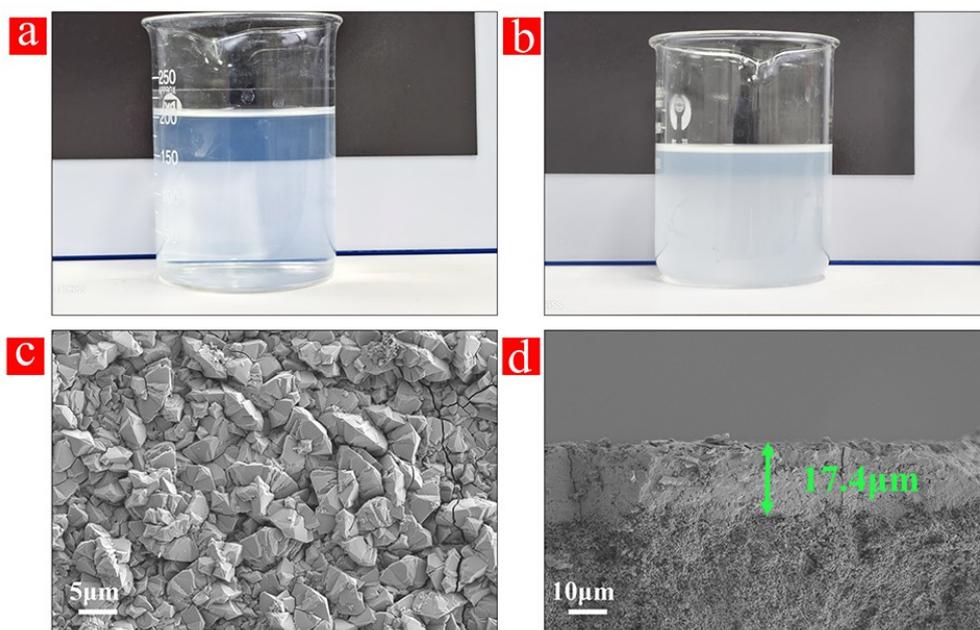


Figure S1 (a) Clear synthetic solution of pure  $K^+$ ; (b) Flocculating synthetic solution with  $K^+/Na^+$  ratio of 5/1; (c) SEM surface image of CHA zeolite membrane hydrothermally synthesized using the flocculating synthetic solution; and (d) Cross-sectional view of the membrane.

Figure S2

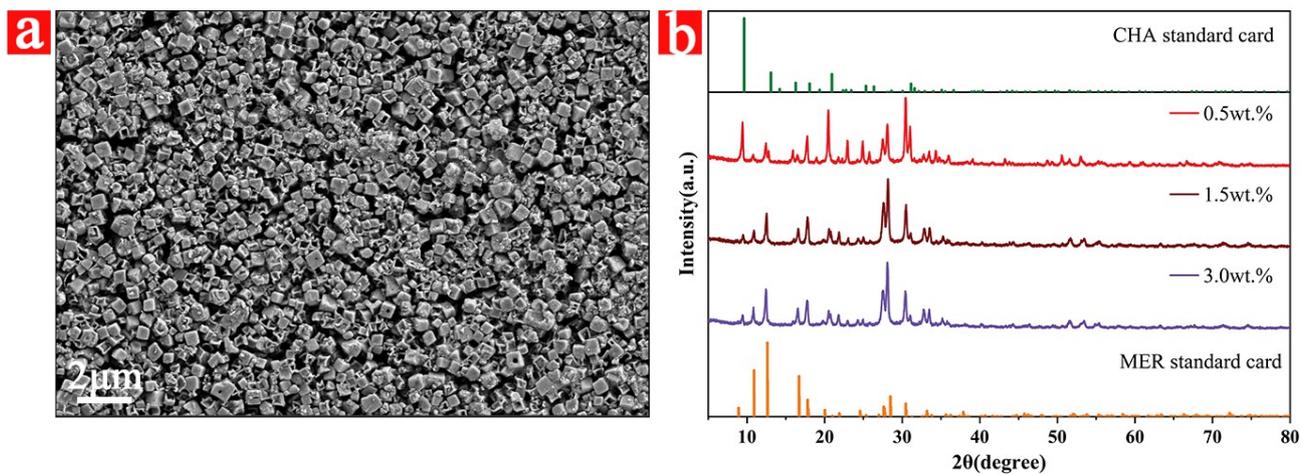


Figure S2 (a) Dissolved high-silica seed crystals; (b) XRD image of solids collected from the synthetic mother liquor of high-silica seed crystals.

### Figure S3

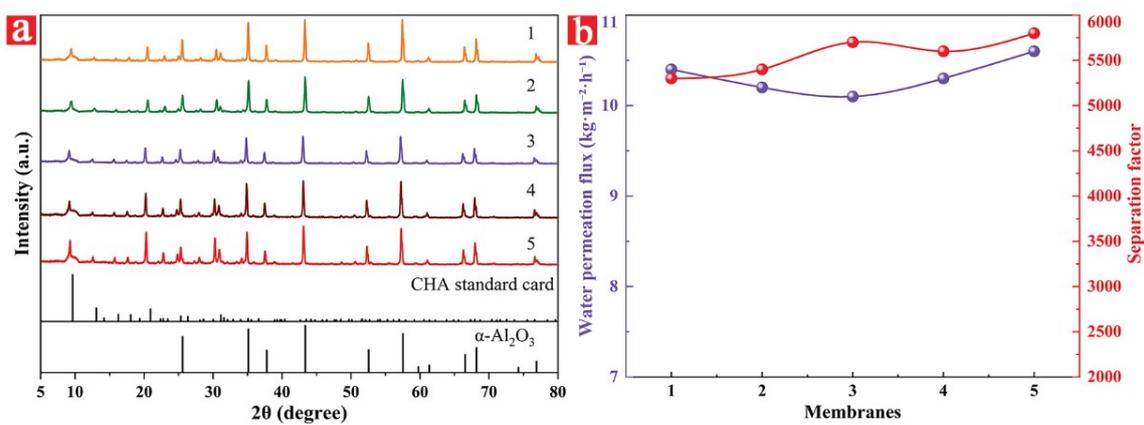


Figure S3 (a) XRD patterns and (b) PV properties of five CHA zeolite membranes reproducible under optimal conditions.

## Table S1

Table S1 Effect of feed flow rate on permeation flux and separation factor.

Flow rate (mL/min)	J (kg m <sup>-2</sup> h <sup>-1</sup> )	$\alpha$
10	10.1	5500
20	10.6	5800
30	10.6	5700