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## **Facilitated CO<sub>2</sub> Transport and Barrier Effect through Ionic Liquid Modified with Cyanuric Chloride**

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### **S1. Experimental details**

1-butyl-3-methyl imidazolium tetrafluoroborate (BMIM<sup>+</sup>BF<sub>4</sub><sup>-</sup>) was purchased from C-tri Co., Ltd. Cyanuric chloride was purchased from Aldrich chemical. All the chemicals were used as received. The solution was prepared as mole ratio of 1/0.1 = BMIM<sup>+</sup>BF<sub>4</sub><sup>-</sup>/cyanuric chloride, and then it was casted using RK control coater (Model 101, Control Coater RK Print-Coat instruments LTD, UK) on a commercial microporous polysulfone membrane support with an average surface pore size of 0.1 μm size (Woongjin Chemical Co., Ltd, Republic of Korea) to fabricate the nanocomposite membranes. Gas permeance values were measured with a bubble flow meter at upstream 2 kgf·cm<sup>-2</sup> and atmospheric downstream pressure. Gas permeance is expressed as units of GPU.

### **Characterization Methods**

Raman spectra was obtained using a Horiba Jobin–Yvon/LabRAM ARAMIS instrument at 785 nm (Diode laser). Fourier transform infrared spectroscopy (FT-IR) data were acquired using the VERTEX 70/70V FT-IR spectrometers (Bruker Optics). Thermogravimetric analysis (TGA) was obtained using Universal V4.5A TA instruments.