

## Supporting Information

### Development of an ion gel-based CO<sub>2</sub> separation membrane composed of Pebax 1657 and a CO<sub>2</sub>-philic ionic liquid

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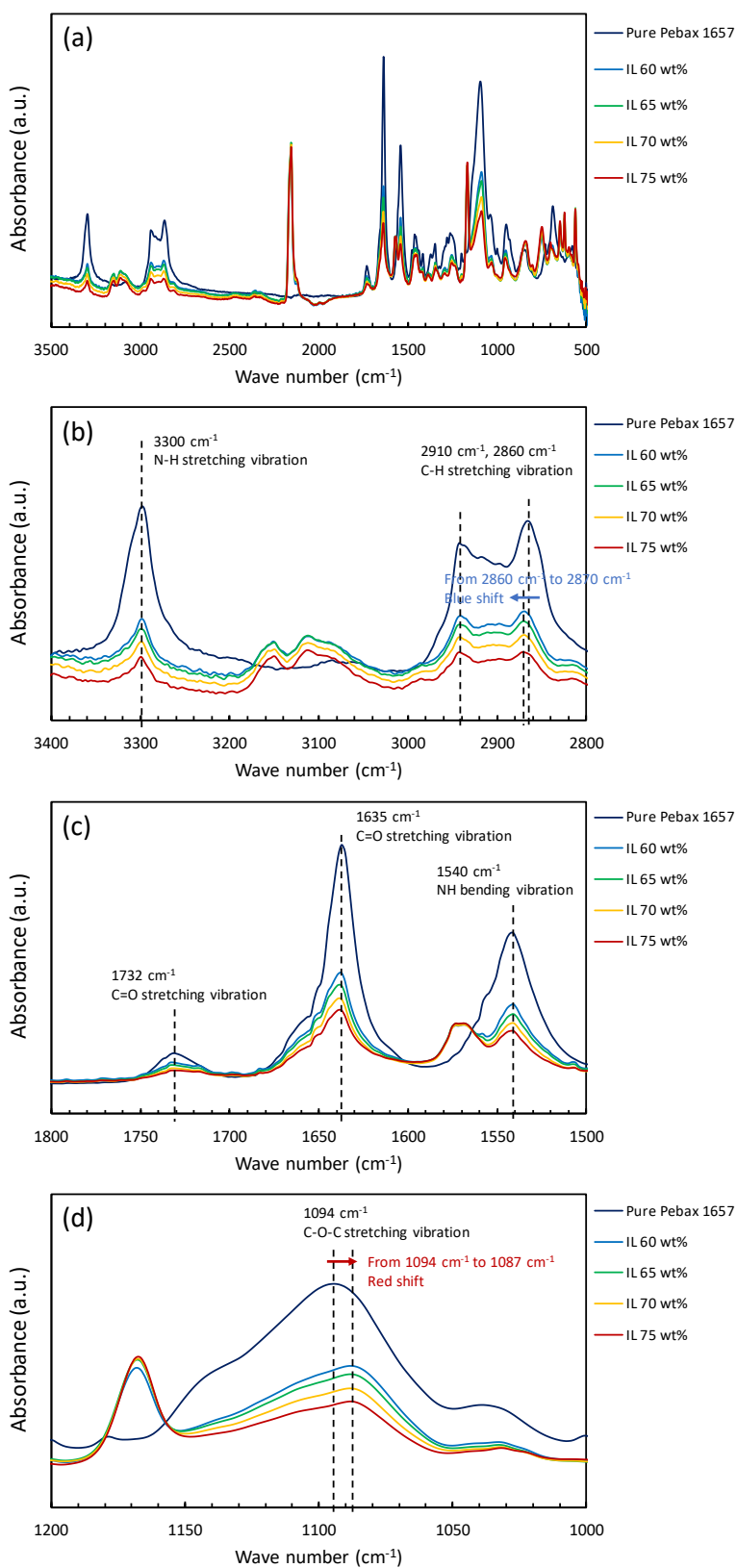
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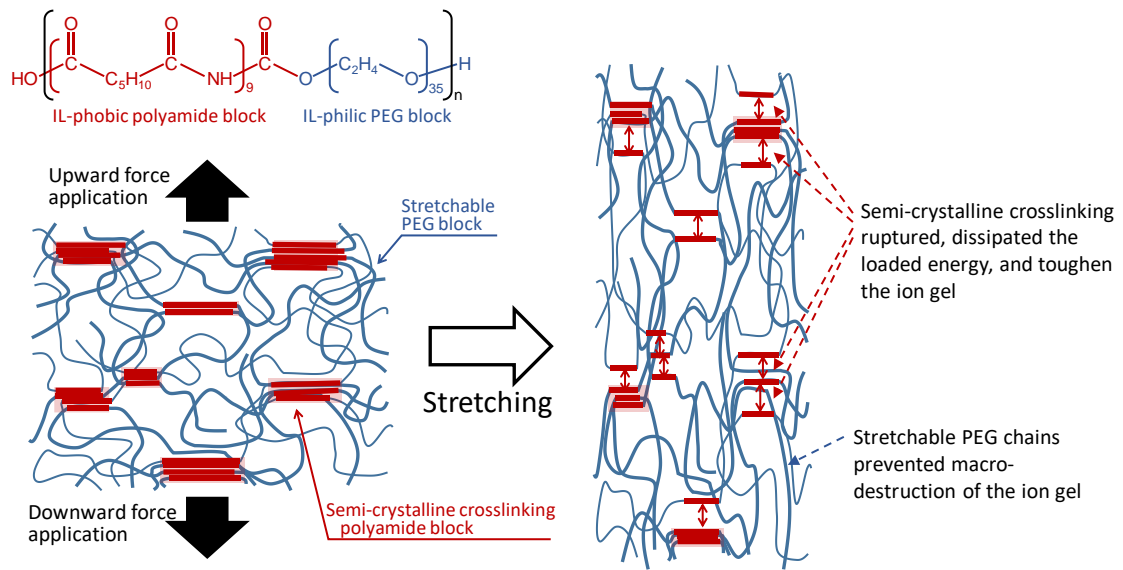
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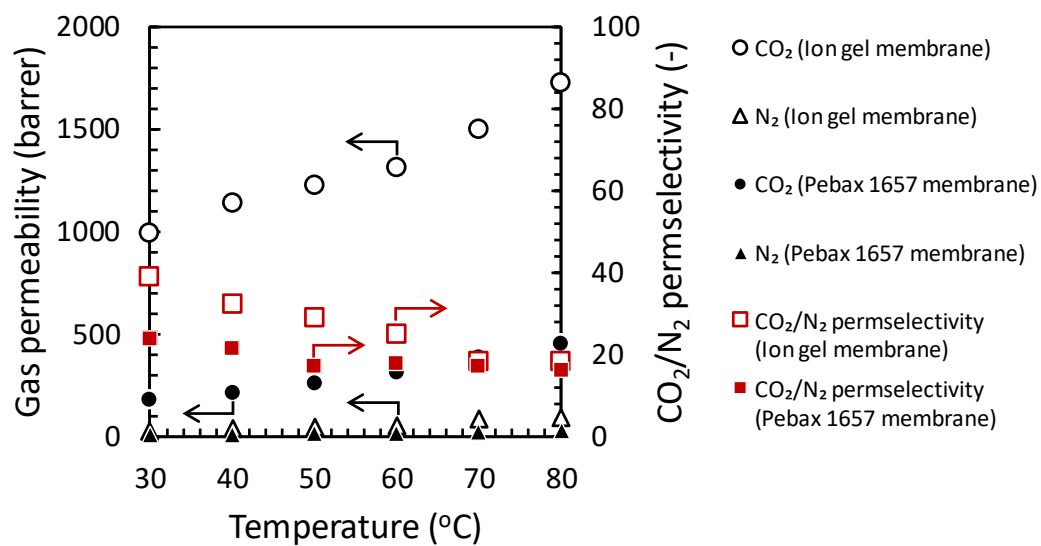
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**Figure S1** FTIR spectra of the Pebax 1657 membrane without  $[\text{Emim}][\text{C}(\text{CN})_3]$  and the Pebax ion gel membrane with different  $[\text{Emim}][\text{C}(\text{CN})_3]$  contents



**Figure S2** Schematic illustration of the speculated gel network structure and toughening mechanism



**Figure S3** Comparison of the CO<sub>2</sub> and N<sub>2</sub> permeabilities and the CO<sub>2</sub>/N<sub>2</sub> permselectivity of the Pebax ion gel membrane and pure Pebax 1657 membrane without an ionic liquid.