

Preparation of polysilsesquioxane-based CO₂ separation membrane with thermally degradable succinic anhydride and urea units

Katsuhiro Horata,¹ Tsubasa Yoshio,¹ Ryuto Miyazaki,¹ Yohei Adachi,¹ Masakoto Kanezashi,² Toshinori Tsuru,^{*,2} Joji Ohshita^{*,1,3}

¹*Smart Innovation Program, Graduate School of Advanced Science and Engineering, Hiroshima University, Higashi-Hiroshima 739-8527, Japan*

²*Chemical Engineering Program, Graduate School of Advanced Science and Engineering, Hiroshima University, Higashi-Hiroshima 739-8527, Japan*

³*Division of Materials Model-Based Research, Digital Monozukuri (Manufacturing) Education and Research Center, Hiroshima University, Higashi-Hiroshima 739-0046, Japan*

Supporting Information

Figure S1. Progress of sol formation from TESPS/BTESE (a) and TESPU/BTESE (b) 1/1 mixtures monitored by DLS measurements at different reaction times ----- pS2

Figure S2. Nitrogen adsorption isotherms for TESPS/BTESE and TESPU/BTESE gels ----- pS3

Figure S3. Temperature dependent gas permeances of TESPS/BTESE and TESPU/BTESE membranes calcined at different temperatures ----- pS4

Figure S4. Comparison of performance of TESPS/BTESE (350) and TESPU/BTESE (300) membranes and that of mix-matrix-membranes and polymer-based membranes, reported previously ----- pS6

Table S1. Activation energies for gas permeation of TESPS/BTESE and TESPU/BTESE membranes ----- pS6

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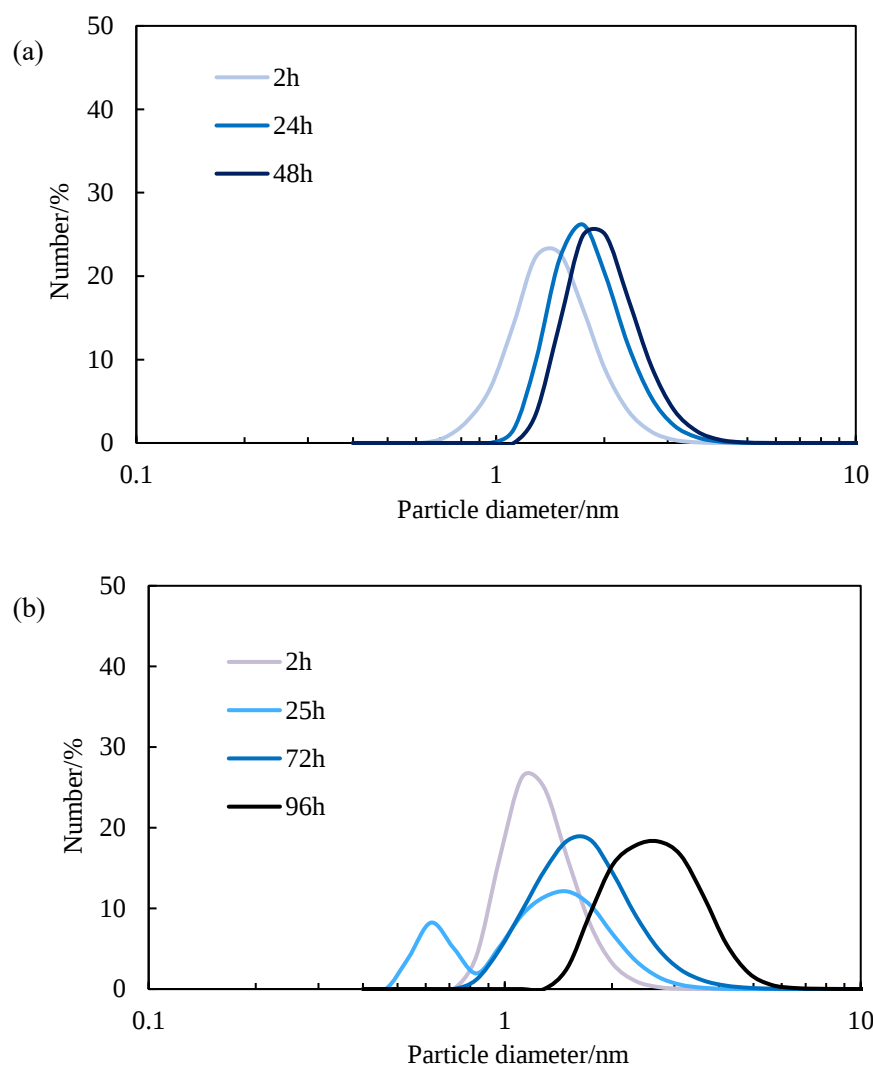


Figure S1. Progress of sol formation from (a) TESPS/BTESE and (b) TESPU/BTESE 1/1 mixtures monitored by DLS measurements at different reaction times.

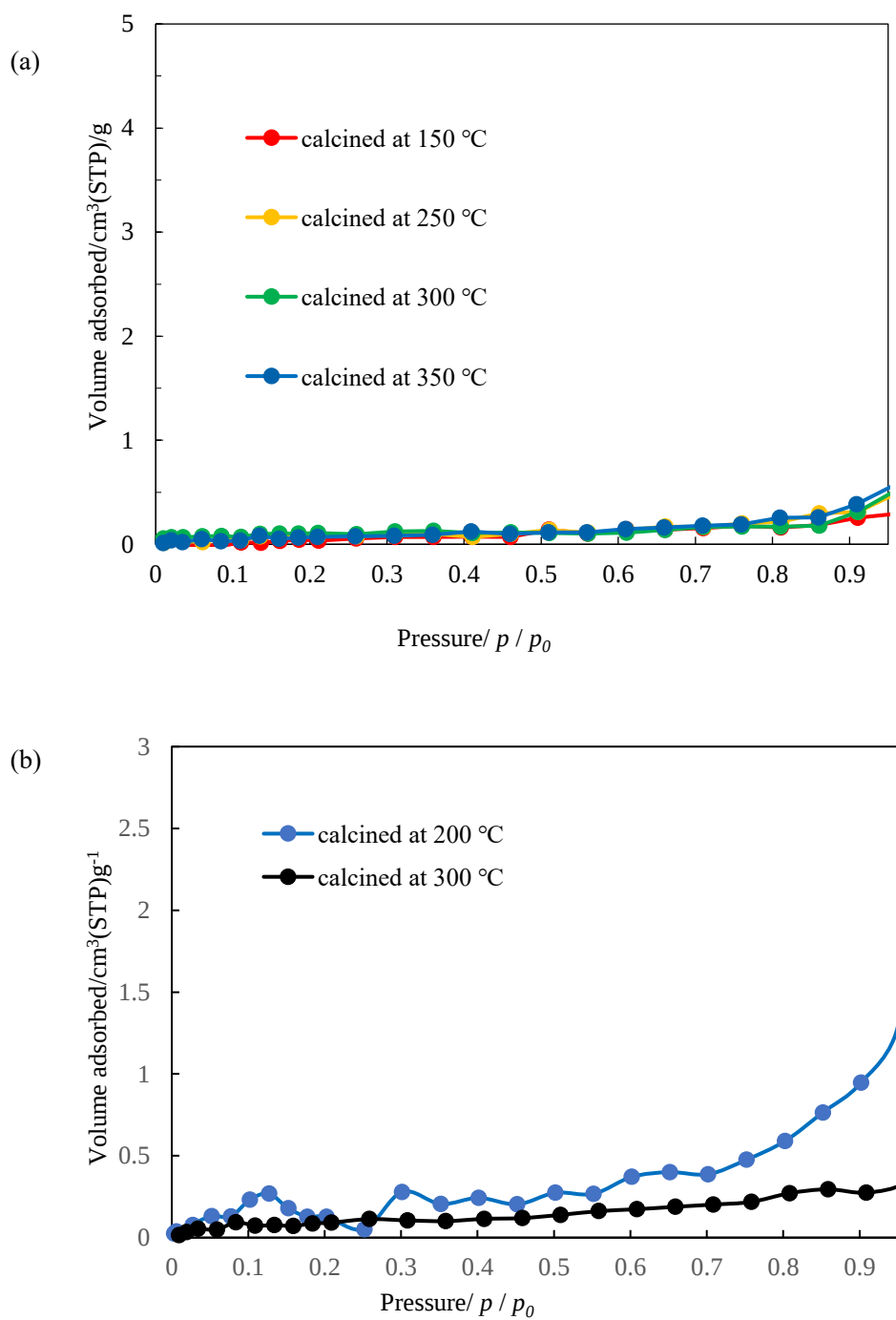


Figure S2. Nitrogen adsorption isotherms for (a) TESPS/BTESE and (b) TESP/BTESE gels calcined at different temperatures.

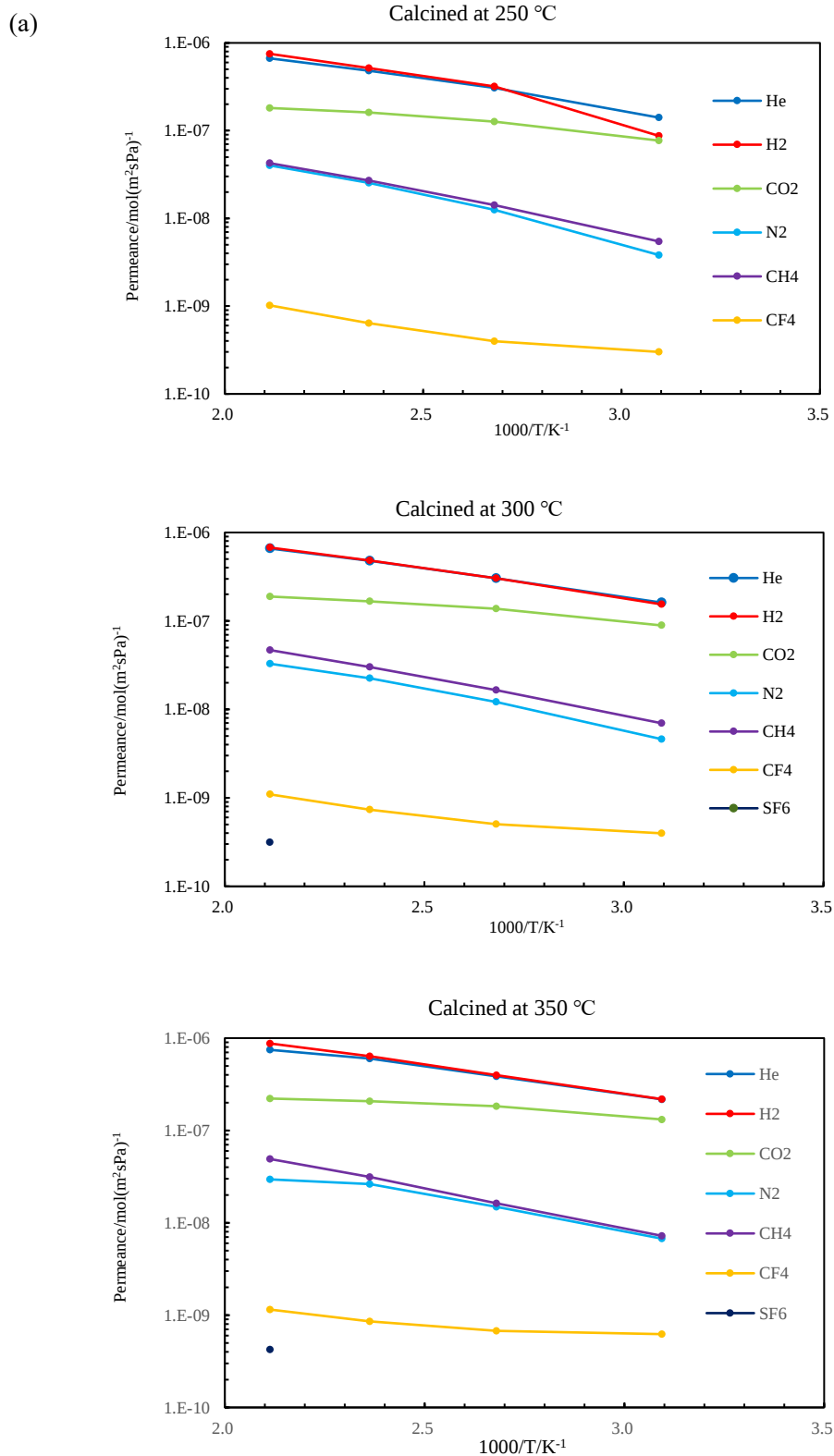


Figure S3. Temperature dependent gas permeances of (a) TESPS/BTESE and (b) TESP/BTESE membranes calcined at different temperatures.

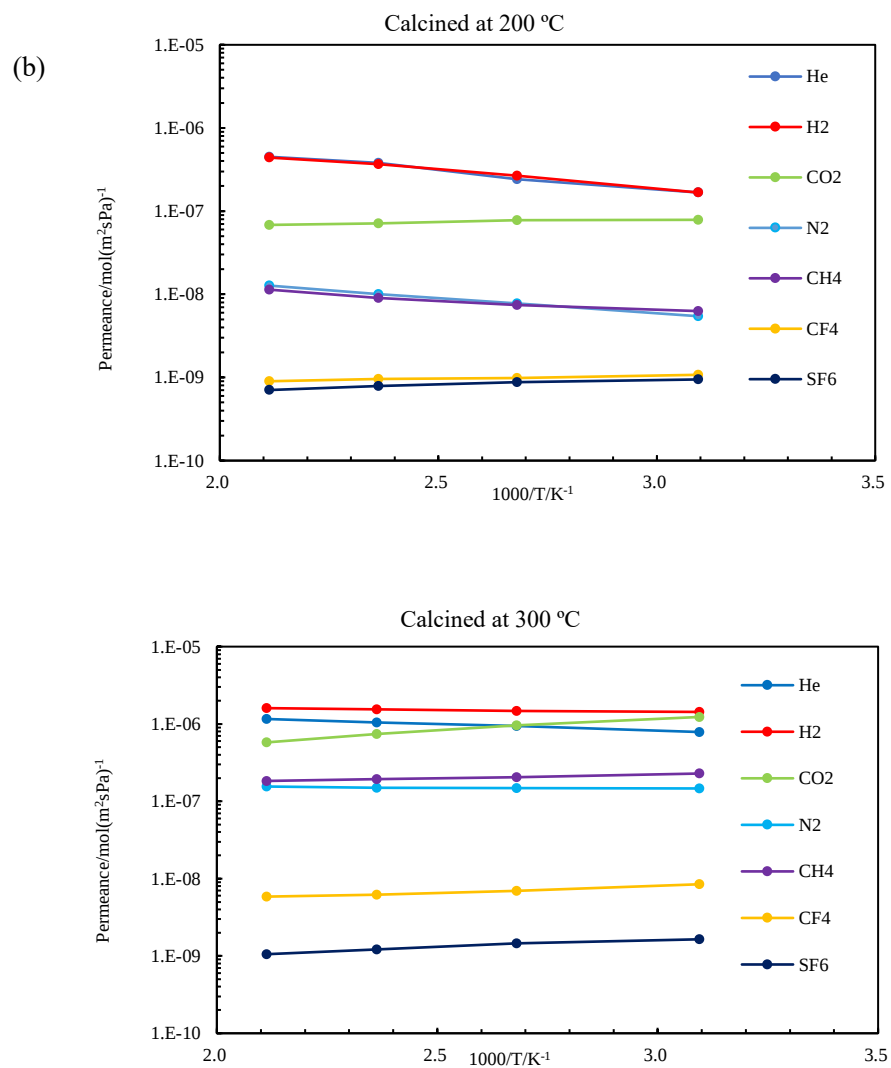


Figure S3. Temperature dependent gas permeances of (a) TESPS/BTESE and (b) TESP/BTESE membranes calcined at different temperatures (continued).

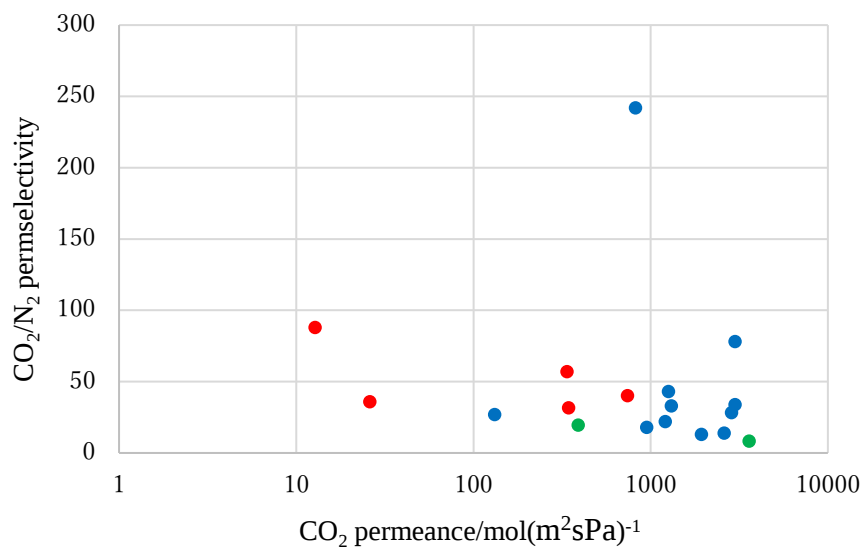


Figure S4. Comparison of performance of TESPS/BTESE (350) and TESP/UTESE (300) membranes (green) and that of mix-matrix-membranes (red) [1-5] and polymer-based membranes (blue) [6-12], reported previously (GPU = gas permeation unit).

Table S1. Activation energies for gas permeation

precursor	calcination temp/°C	$E_{act}/\text{kJmol}^{-1}$						
		H ₂	He	CO ₂	N ₂	CH ₄	CF ₄	SF ₆
TESPS	250	18.1	13.2	7.3	17.2	17.5	10.3	-
/BTESE	300	12.5	12.0	6.4	14.7	16.2	8.5	-
	350	11.9	10.7	4.4	10.3	16.4	5.1	-
TESPU	200	8.3	8.7	-1.2	7.1	4.9	-1.4	-2.5
/BTESE	300	1.0	3.2	-6.4	0.5	-1.9	-3.2	-3.8

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