Carbon membranes prepared from poly(furfuryl alcohol-furfural) precursors: effect of FeCl3 additive

Supplementary material file

Table S1. *H_2, CO_2 and CH_4 permeance and corresponding H_2/CH_4 and H_2/CO_2 selectivity for the C1-TS membrane (corresponding Figs. 9 and 10).*

Coating cycles	Pyrolysis temperature	Permeance (mol m^{-2} s^{-1} Pa^{-1})			Selectivity	
#	(°C)	H_2	CO_2	CH_4	H_2/CH_4	H_2/CO_2
3	500	nm*	nm	$6{,}94\times10^{-8}$	nm	nm
4	500	$5{,}12\times10^{-8}$	nm	$2{,}32\times10^{-8}$	2,20	nm
5	500	$1{,}93\times10^{-8}$	nm	$3{,}79\times10^{-9}$	5,08	nm
6	500	$1{,}34\times10^{-8}$	nm	$2{,}57\times10^{-9}$	5,23	nm
7	500	$1{,}23\times10^{-8}$	nm	$2{,}05\times10^{-9}$	5,98	nm
8	500	$1{,}24\times10^{-8}$	$1{,}46\times10^{-8}$	$1{,}77\times10^{-9}$	7,01	0,85
8	700	nm	nm	$2{,}02\times10^{-8}$	nm	nm
9	700	$4{,}27\times10^{-8}$	$3{,}95\times10^{-8}$	$3{,}62\times10^{-9}$	11,81	1,08
10	700	$1{,}80\times10^{-8}$	$1{,}18\times10^{-8}$	$6{,}57\times10^{-10}$	27,34	1,52
11	700	$8{,}00\times10^{-9}$	$1{,}76\times10^{-9}$	$1{,}60\times10^{-10}$	49,98	4,54
12	700	$2{,}04\times10^{-9}$	$1{,}42\times10^{-10}$	$2{,}87\times10^{-11}$	70,80	14,38
12	800	$9{,}31\times10^{-9}$	$1{,}47\times10^{-9}$	$4{,}62\times10^{-10}$	20,15	6,3
13	800	$1{,}35\times10^{-9}$	$9{,}2\times10^{-11}$	$1{,}16\times10^{-10}$	11,67	14,67
14	800	$6{,}41\times10^{-10}$	$1{,}4\times10^{-11}$	$1{,}7\times10^{-11}$	38,20	45,13
14	900	$1{,}52\times10^{-9}$	$1{,}4\times10^{-10}$	$1{,}68\times10^{-10}$	9,00	10,66
15	900	$1{,}20\times10^{-9}$	$7{,}2\times10^{-11}$	$8{,}1\times10^{-11}$	14,88	16,5
16	900	$7{,}77\times10^{-10}$	$2{,}2\times10^{-11}$	$1{,}8\times10^{-11}$	42,32	36,12
16	1000	$4{,}53\times10^{-10}$	$5{,}5\times10^{-11}$	$8{,}4\times10^{-11}$	5,42	8,3
17	1000	$2{,}91\times10^{-10}$	$3{,}2\times10^{-11}$	$5{,}3\times10^{-11}$	5,55	9,13

* nm: not measured

Table S2. *H_2, CO_2 and CH_4 permeance and corresponding H_2/CH_4 and H_2/CO_2 selectivity for the C2-Fe membrane (corresponding Figs. 11 and 12).*

	Pyrolysis temperature	**Permeance (mol m^{-2} s^{-1} Pa^{-1})**			**Selectivity**	
Coating cycles	**(°C)**	**H_2**	**CO_2**	**CH_4**	**H_2/CH_4**	**H_2/CO_2**
3	500	nm*	nm	$3{,}62\times10^{-8}$	nm	nm
4	500	$2{,}34\times10^{-8}$	nm	$4{,}65\times10^{-9}$	5,03	nm
5	500	$1{,}12\times10^{-8}$	nm	$8{,}23\times10^{-10}$	13,59	nm
6	500	$8{,}02\times10^{-9}$	$3{,}21\times10^{-9}$	$3{,}73\times10^{-10}$	21,50	2,50
7	500	$6{,}33\times10^{-9}$	$2{,}32\times10^{-9}$	$2{,}62\times10^{-10}$	24,14	2,72
8	500	$6{,}14\times10^{-9}$	$2{,}69\times10^{-9}$	$1{,}80\times10^{-10}$	33,98	2,28
8	700	nm	nm	$1{,}46\times10^{-8}$	nm	nm
9	700	$2{,}19\times10^{-8}$	$1{,}29\times10^{-8}$	$2{,}56\times10^{-9}$	8,58	1,70
10	700	$1{,}16\times10^{-8}$	$4{,}46\times10^{-9}$	$5{,}20\times10^{-10}$	22,25	2,59
11	700	$6{,}30\times10^{-9}$	$1{,}57\times10^{-9}$	$1{,}65\times10^{-10}$	38,16	4,01
12	700	$2{,}71\times10^{-9}$	$3{,}54\times10^{-10}$	$1{,}13\times10^{-10}$	23,92	7,66
12	800	$1{,}76\times10^{-8}$	nm	$3{,}84\times10^{-9}$	4,58	nm
13	800	$3{,}54\times10^{-9}$	nm	$7{,}10\times10^{-10}$	4,99	nm
14	800	$3{,}10\times10^{-9}$	$3{,}82\times10^{-10}$	$4{,}50\times10^{-10}$	6,89	8,11
14	900	$1{,}03\times10^{-8}$	$1{,}86\times10^{-9}$	$2{,}62\times10^{-9}$	3,94	5,56
15	900	$5{,}94\times10^{-9}$	$9{,}91\times10^{-10}$	$1{,}52\times10^{-9}$	3,91	5,99
16	900	$1{,}99\times10^{-9}$	$2{,}37\times10^{-10}$	$3{,}75\times10^{-10}$	5,31	8,39
17	900	$1{,}24\times10^{-9}$	$1{,}07\times10^{-10}$	$1{,}49\times10^{-10}$	8,34	11,58
18	900	$4{,}72\times10^{-10}$	$8{,}2\times10^{-12}$	$1{,}3\times10^{-11}$	35,31	57,88
18	1000	$5{,}76\times10^{-9}$	$1{,}28\times10^{-9}$	$1{,}47\times10^{-9}$	3,92	4,49
19	1000	$2{,}34\times10^{-9}$	$3{,}66\times10^{-10}$	$4{,}94\times10^{-10}$	4,73	6,39

* nm: not measured