Table S1. The results for the PLA membranes obtained by the wet method.

Sample	Time [s]	Gas composition	Power [W]	Contact angle [degree]		Dispersion component [mJ/m^2]	Polar component [mJ/m^2]	SFE [mJ/m^2]
				Water	diiodomethane			
1	fresh	-	-	47.7	24.1	35.6	21.4	57.1
2	15	CO_2	15	35.0	33.8	29.5	32.7	62.2
3	15	CO_2	20	29.5	25.4	32.2	34.0	66.1
4	15	CO_2	30	36.6	31.9	30.6	31.1	61.7
5	15	CO_2	40	32.8	25.4	32.6	31.9	64.5
6	15	CO_2	50	35.8	28.8	31.8	30.8	62.6
7	15	Ar	20	37.4	23.5	34.0	28.5	62.5
8	30	Ar	20	33.9	27.2	32.1	31.6	63.7
9	60	Ar	20	25.2	25.1	31.8	36.3	68.1
10	30	CO_2	20	35.3	27.6	32.2	30.8	63.0
11	60	CO_2	20	30.6	24.5	32.7	33.1	65.7
12	15	Ar+air	20	36.2	29.1	31.7	30.6	62.2
13	30	Ar+air	20	32.1	18.8	34.7	31.0	65.7
14	60	Ar+air	20	27.6	22.6	32.9	34.4	67.3
15	15	Ar+CO_2	20	32.7	27. 6	31.8	32.5	64.3
16	30	Ar+CO_2	30	38.3	24.8	33.7	28.2	61.8
17	60	Ar+CO_2	20	37.6	27.6	32.5	29.2	61.8

Table S2. The results for the PLA membranes obtained by the dry method.

Sample	Time [s]	Gas composition	Power [W]	Contact angle [degree]		Dispersion component [mJ/m^2]	Polar component [mJ/m^2]	SFE [mJ/m^2]
				Water	Diiodomethane			
1	fresh	-	-	62.7	24.5	38.9	11.3	50.2
2	15	CO_2	15	51.5	22.4	37.0	18.5	55.5
3	15	CO_2	20	34.2	22.6	33.8	30.4	64.2
4	15	CO_2	40	44.2	29.9	32.7	25.1	57.8
5	15	CO_2	50	46.7	22.5	36.0	21.8	57.8
6	15	Ar	20	54.4	24.6	36.8	16.8	53.7
7	30	Ar	20	50.9	27.8	34.9	19.8	54.7
8	60	Ar	20	39.7	27.5	32.9	27.8	60.7
9	30	CO_2	20	46.9	29.3	33.5	23.1	56.5
10	60	CO_2	20	36.0	30.5	31.1	31.1	62.2
11	15	Ar+air	20	41.0	42.4	26.2	31.3	57.6
12	30	Ar+air	20	38.7	35.2	29.4	30.6	60.0
13	60	Ar+air	20	37.0	37.3	28.2	32.5	60.6
14	15	Ar+CO_2	20	49.8	36.0	31.0	22.6	53.5
15	30	Ar+CO_2	20	34.5	34.2	29.3	33.2	62.5
16	60	Ar+CO_2	20	24.2	34.2	28.1	39.5	67.6