

Low-Hydrophilic HKUST-1/Polymer Extrudates for the PSA Separation of CO₂/CH₄

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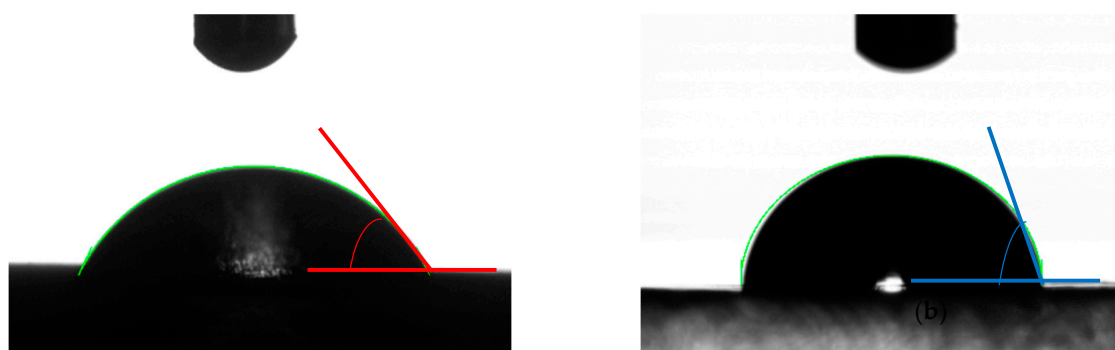


Figure S1: Image of water drop onto the surface of PLA (left) and TPU (right).

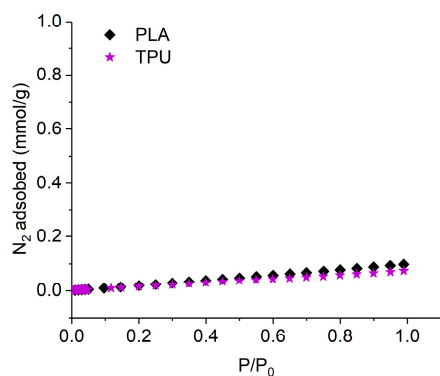


Figure S2. N₂ adsorption isotherm plot for TPU and PLA. Data for PLA was taken from previous study [1]

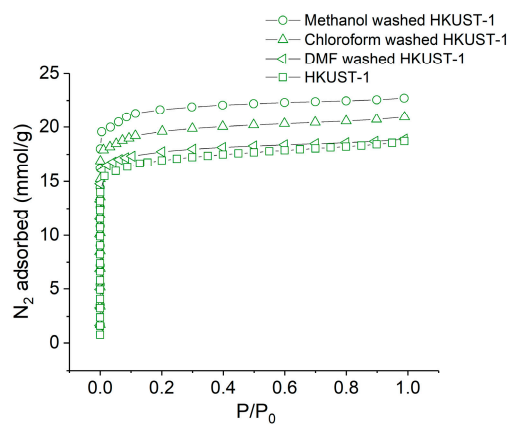


Figure S3. N₂ adsorption isotherms on HKUST-1 and solvent-washed HKUST-1.

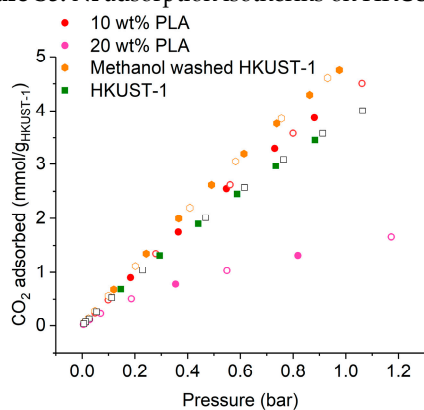


Figure S4: Normalize CO₂ adsorption isotherm plot for pristine HKUST-1, methanol washed HKUST-1 and HKUST-1/PLA composites with different binder fraction.

Table S1: Fitting Parameters of the Dual-site Langmuir Isotherm Model for the CO₂ and CH₄ pure isotherms on HKUST-1, HKUST-1/PLA and HKUST-1/TPU.

		HKUST-1						HKUST-1/PLA						HKUST-1/TPU					
		CO ₂			CH ₄			CO ₂			CH ₄			CO ₂			CH ₄		
Isotherm model	Fitted parameters	273 K	298 K	323 K	273 K	298 K	323 K	273 K	298 K	323 K	273 K	298 K	323 K	273 K	298 K	323 K	273 K	298 K	323 K
Dual-Site Langmuir	R ²	0.998	0.999	0.999	0.998	0.997	0.998	0.998	0.998	0.999	0.999	0.999	0.998	0.998	0.997	0.999	0.999	0.996	0.996
	q _{s1} (mol/kg)	12.23			9.81			14.61			16.07			14.50			15.30		
	q _{s2} (mol/kg)	2.09			2.09			2.09			2.09			2.09			2.09		
	k _{a1} (bar ⁻¹)	116.76			1.83			48.14			0.67			44.23			1.10		
	k _{a2} (K ⁻¹)	3066.95			1762.24			2685.58			1418.62			2614.42			1724.25		
	k _{b1} (bar ⁻¹)	60.29			60.28			60.29			60.28			60.29			60.28		
	k _{b2} (K ⁻¹)	1404.2			36328.4			14404.1			36328.42			14404.5			36328.42		

Table S2. BET Surface area, pore volume of HKUST-1 and the respective solvent-washed HKUST-1.

Sample	S _{BET} (m ² /g)	Micropore volume (cm ³ /g)	Total pore volume (cm ³ /g)
Pristine HKUST-1	1500	0.46	0.65
DMF washed HKUST-1	1616	0.46	0.65
Chloroform washed HKUST-1	1762	0.51	0.72
Methanol washed HKUST-1	1956	0.60	0.79

References

1. Rozaini, Muhamad Tahriri, Denys I. Grekov, Mohamad Azmi Bustam, and Pascaline Pré, "Shaping of HKUST-1 via Extrusion for the Separation of CO₂/CH₄ in Biogas," *Separations* , vol. 10, no. 9, p. 487, 2023.