Electronic Supplementary Material (ESI) for Materials Advances.

Electronic Supplementary Information for

MOF@PVA beads for dynamic and low concentration VOC capture

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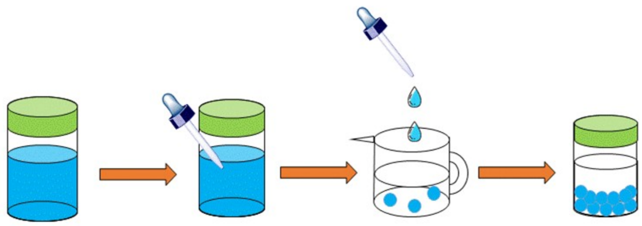

Scheme S1. MOF@PVA bead preparation

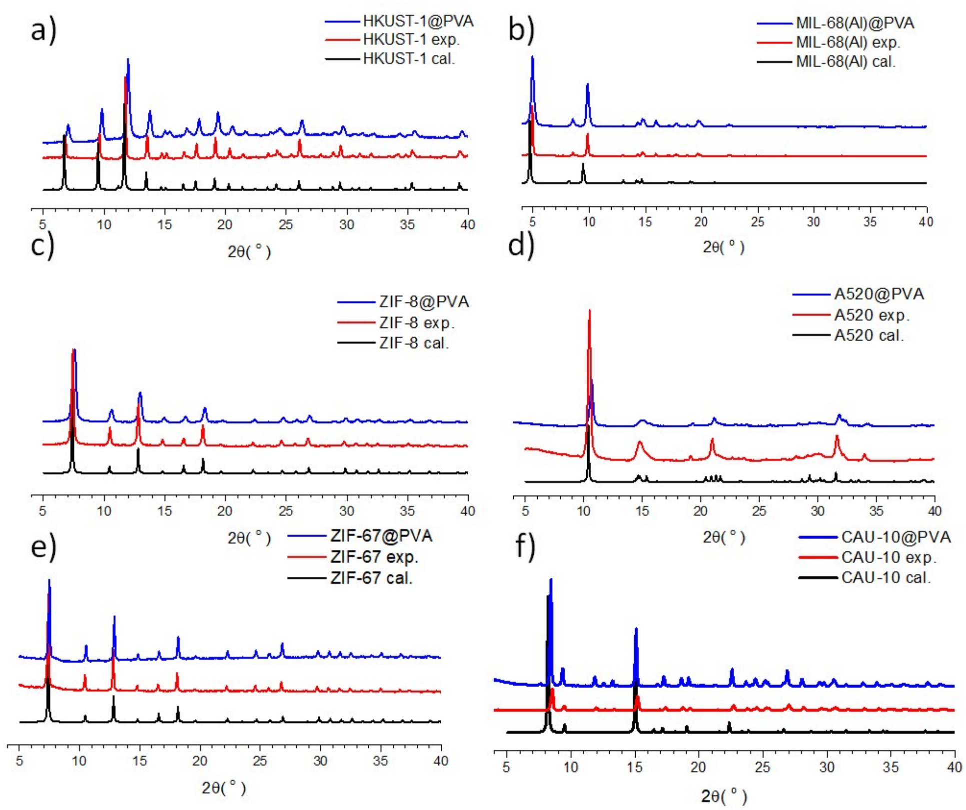

Figure S1. PXRD patterns of MOF powders and MOF@PVA beads in comparison with calculated values. a) HKUST-1, b) MIL-68, c) ZIF-8, d) A520, e) ZIF-67, and f) CAU-10.

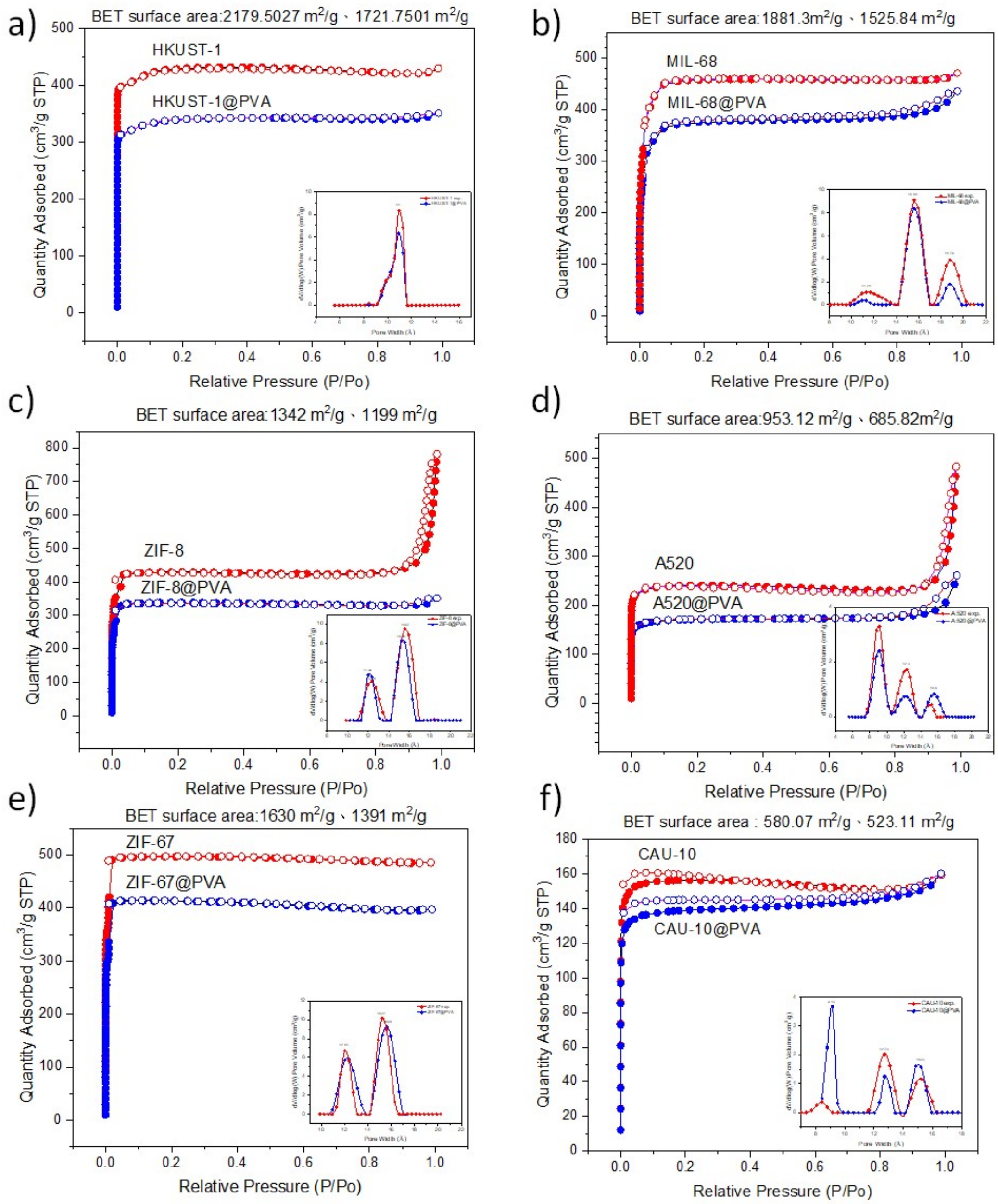

Figure S2. Comparison of the N_2 adsorption-desorption isotherm (inset: pore size distribution). a) HKUST-1, b) MIL-68, c) ZIF-8, and d) A520.

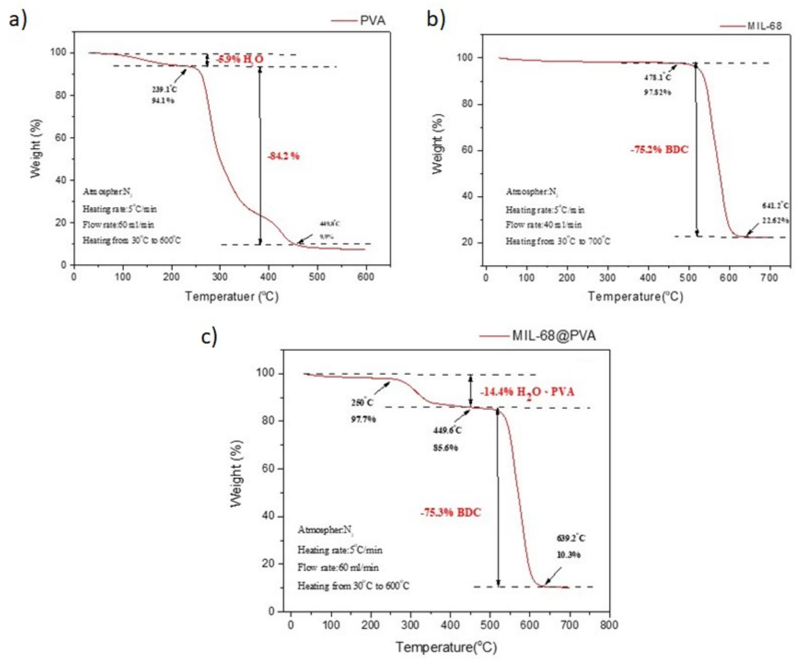

Figure S3. Thermogravimetric analyses of a) PVA, b) MIL-68, and c) MIL-68@PVA

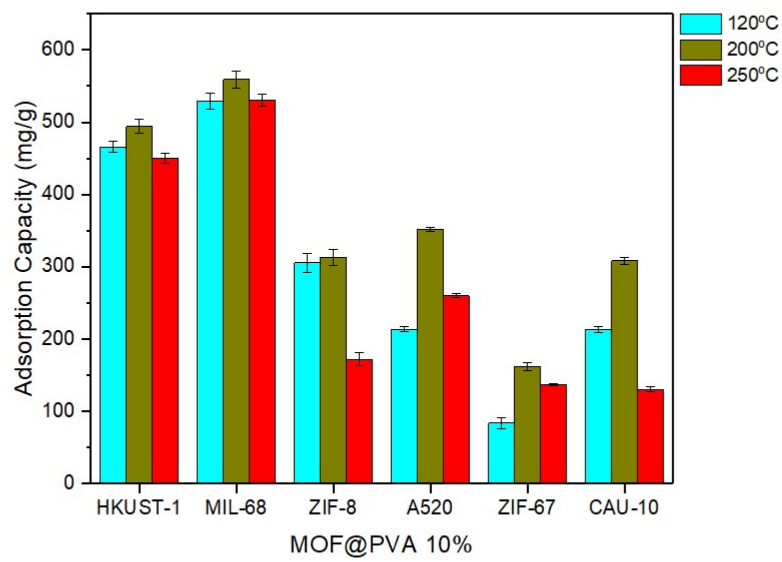

Figure S4. Comparison of the different activation temperature on their effect on the adsorption capacities (weights were measured before and after a preliminary 2-hour exposure in the vacuumed glass chamber)

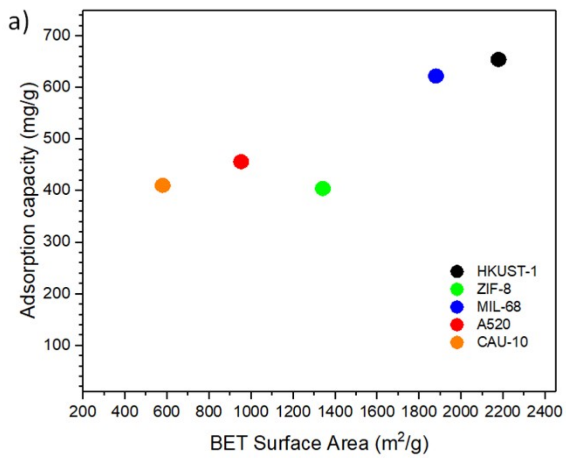

Figure S5. Plot of formaldehyde adsorption capacity vs a) BET surface area and b) average pore width of the MOF powder samples.

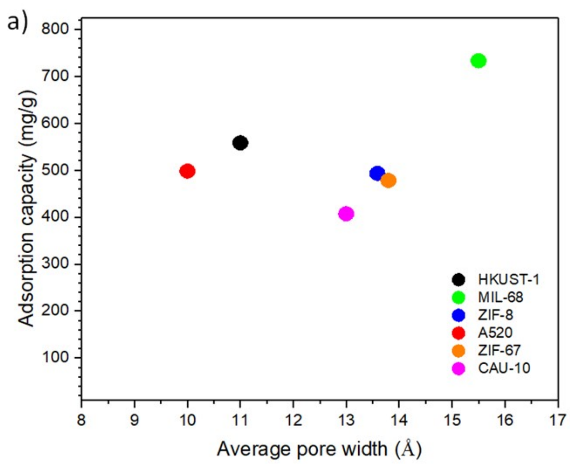

Figure S6. Plot of toluene adsorption capacity vs a) average pore width and b) BET surface area of the MOF powder samples.

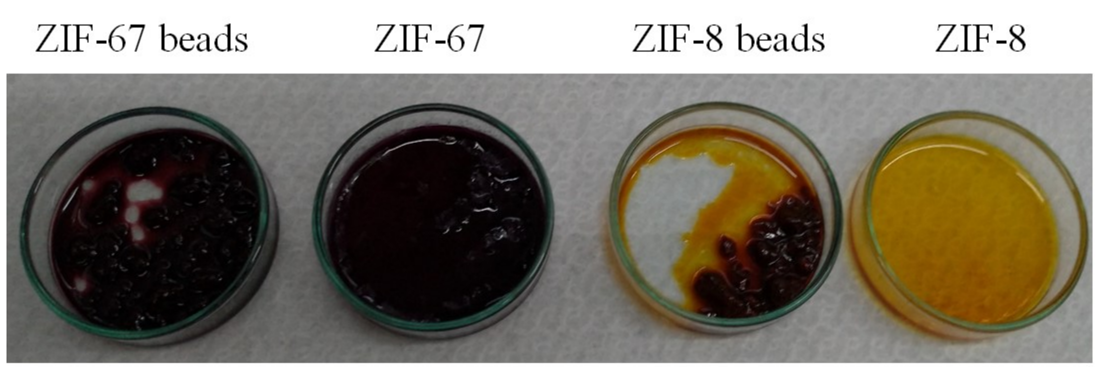

Figure S7. ZIF-67@PVA beads, ZIF-67, and ZIF-8@PVA beads, and ZIF-8 after acetic acid exposure

Table S1. Comparison of the MOF pore sizes and the kinetic diameters of VOCs

MOF	BET surface area (m^2/g)	Pore size (Å)	VOC	Kinetic diameter (Å)
HKUST-1	2179	9, 11	Acetone	4.5
ZIF-8	1341	12	IPA	4.7
ZIF-67	1630	15	Formaldehyde	2.5
MIL-68	1881	11, 15.6	Toluene	5.85
A520	953	9.2	Acetic acid	3.9

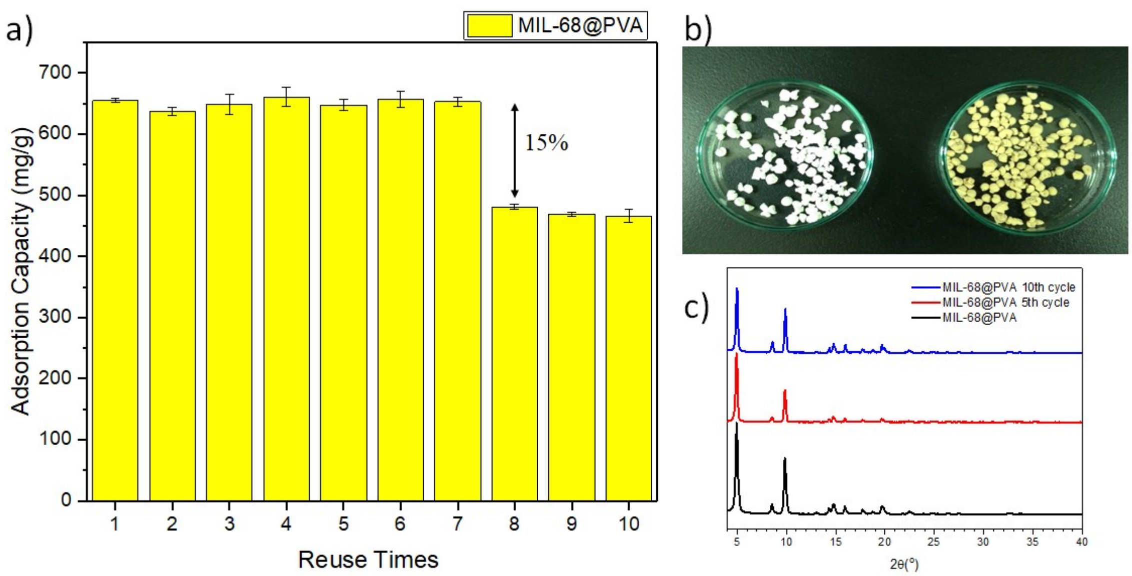

Figure S8. Characterization for MIL-68@PVA undergoing 10 cycles of toluene adsorption.

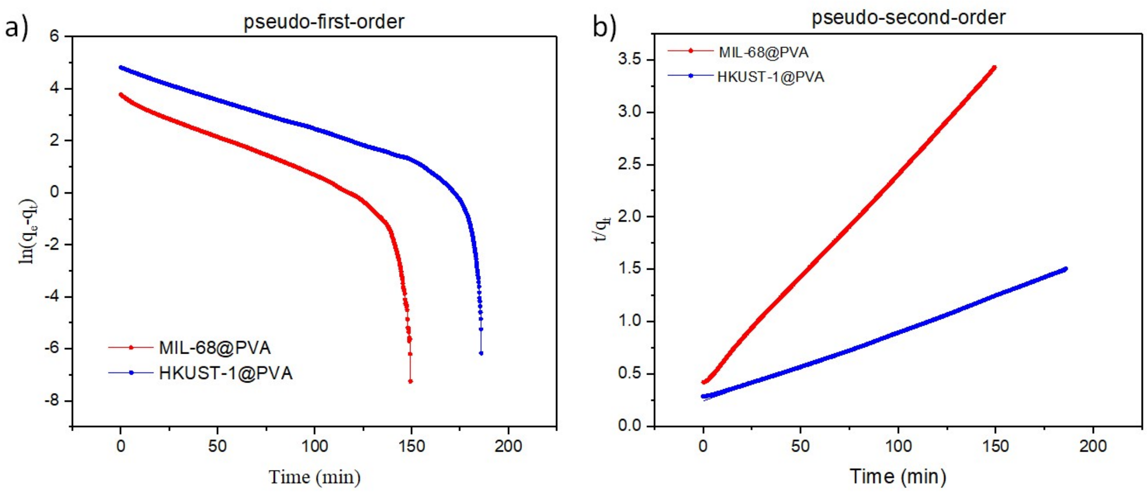

Figure S9. Fitted curves of the kinetic models for MIL-68@PVA and HKUST-1@PVA

Table S2. Kinetic parameters obtained from the intraparticle diffusion model

MOF@ PVA Beads	External surface adsorption			Intraparticle diffusion			Adsorption equilibrium		
	K_I	C_I	R^2	K_{II}	C_{II}	R^2	K_{III}	C_{III}	R^2
MIL-68	4.9191	-1.5684	0.9543	4.2293	4.5401	0.9777	1.15114	29.9332	0.9734
HKUST-1	9.0629	-4.6127	0.9744	13.5953	-9.2730	0.9908	3.6889	75.0765	0.9694