

Supporting Information

Imidazole encapsulated in core–shell MOFs@COFs with high anhydrous proton conductivity

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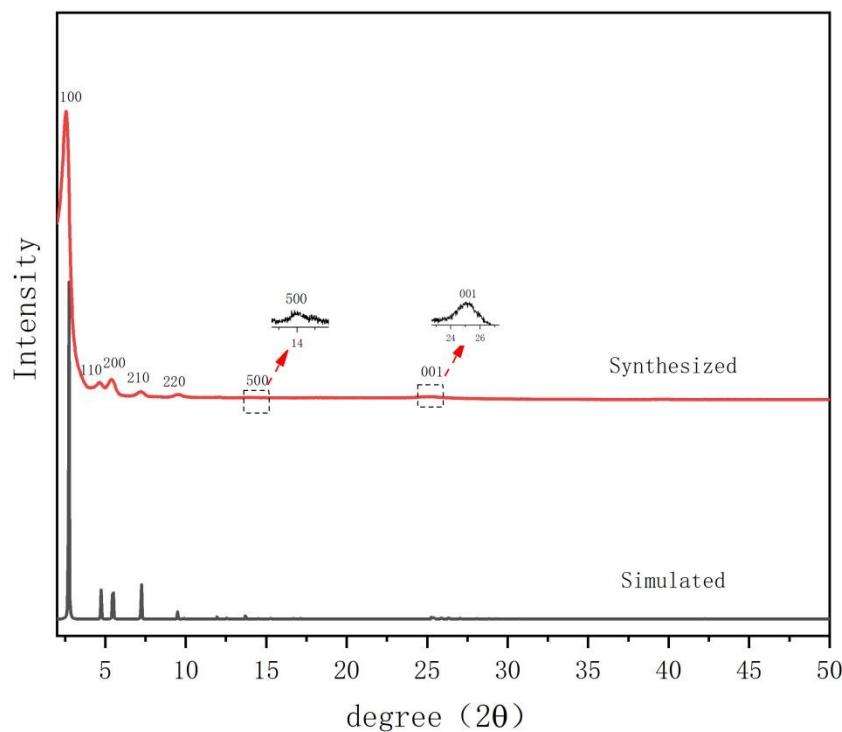


Fig. S1 PXRD pattern of TAPB-DMTP-COFs

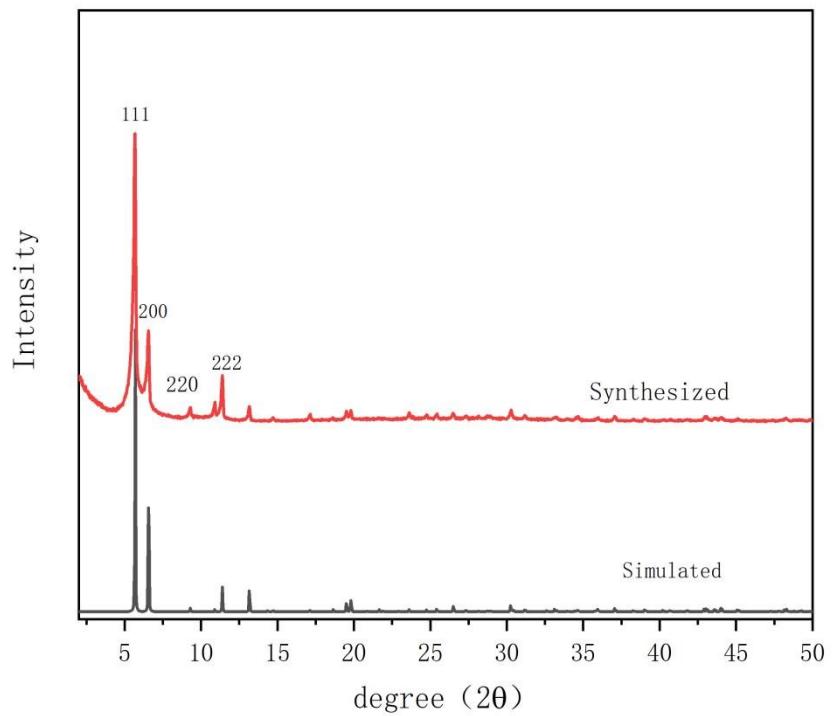


Fig. S2 PXRD pattern of UiO-67

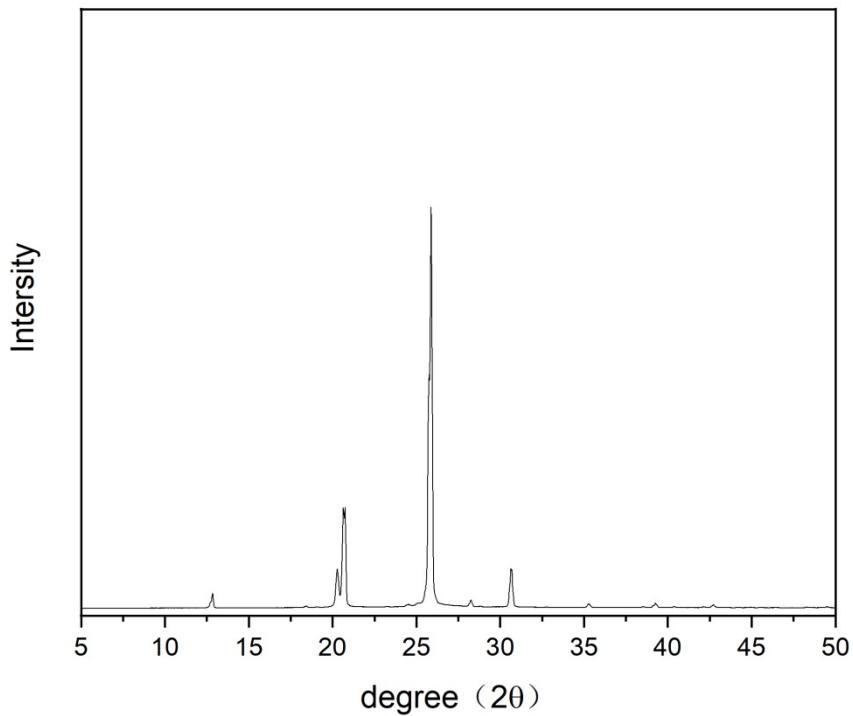


Fig. S3 PXRD pattern of Imidazole

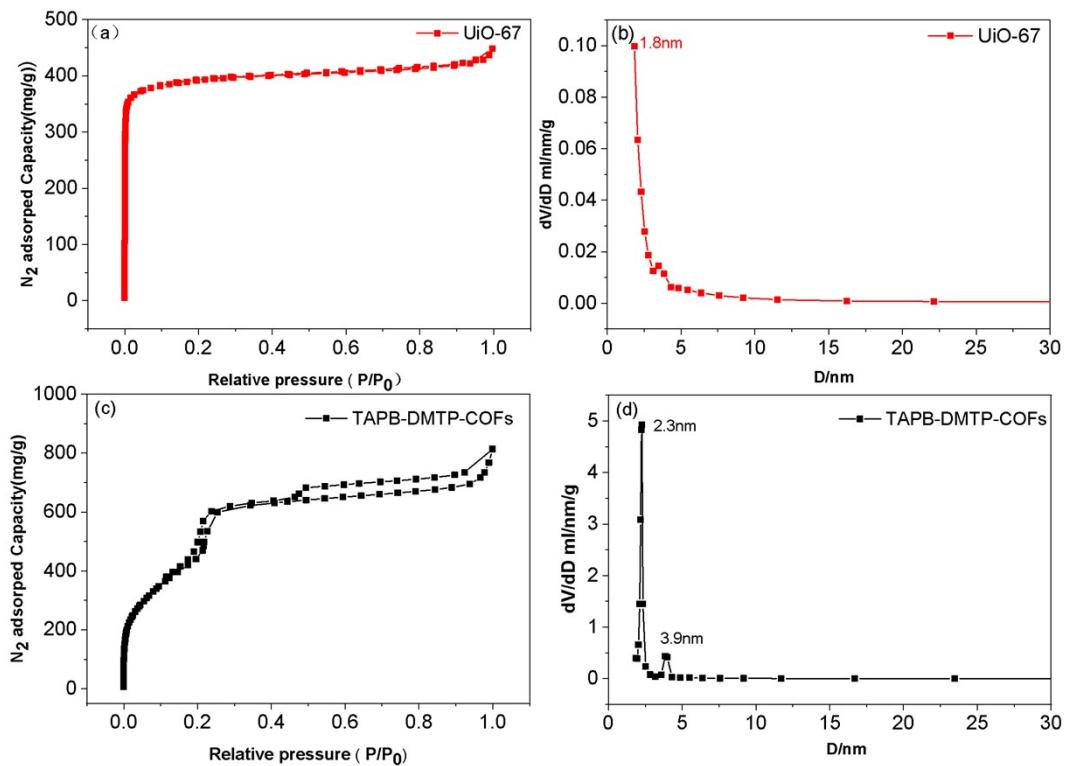


Fig.S4 N₂ adsorption-desorption isotherms and pore size distributions of UiO-67 (a,b)
and TAPB-DMTP-COFs(c,d)

Table S1 Specific surface and pore volume of the samples

Materials	BET Surface Area (m ² g ⁻¹)	Langmuir Surface Area (m ² g ⁻¹)	Pore Volume (cm ³ g ⁻¹)
TAPB-DMTP-COFs	1962	2897	1.19
UiO-67	1218	1751	0.68
MC-1	1040	1695	0.62
MC-3	1181	1715	1.05
Im@MC-11	14	24	0.07
Im@MC-12	10	14	0.07

Im@MC-31	10	17	0.07
Im@MC-32	6.7	11	0.09

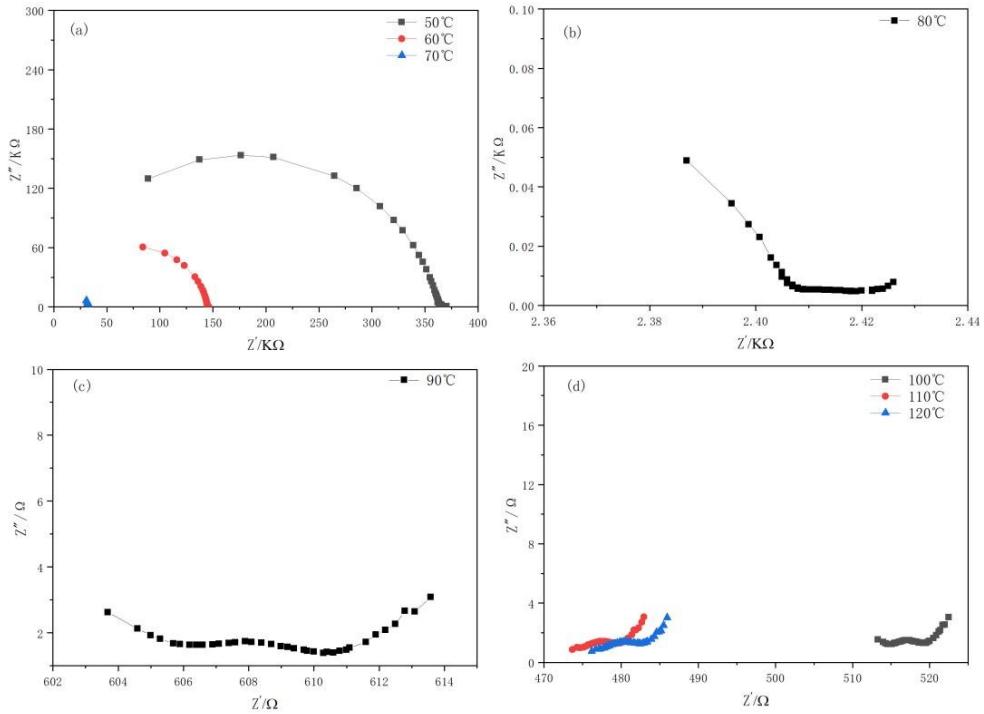


Fig.S5 Impedance spectra of Im@MC-11

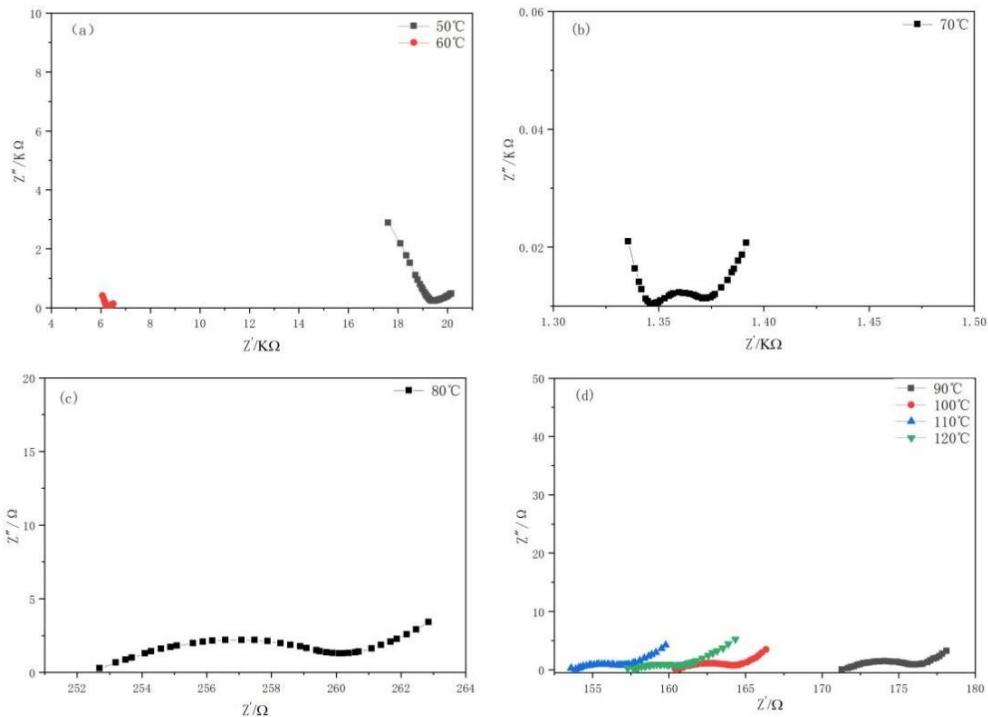


Fig.S6 Impedance spectra of Im@MC-31

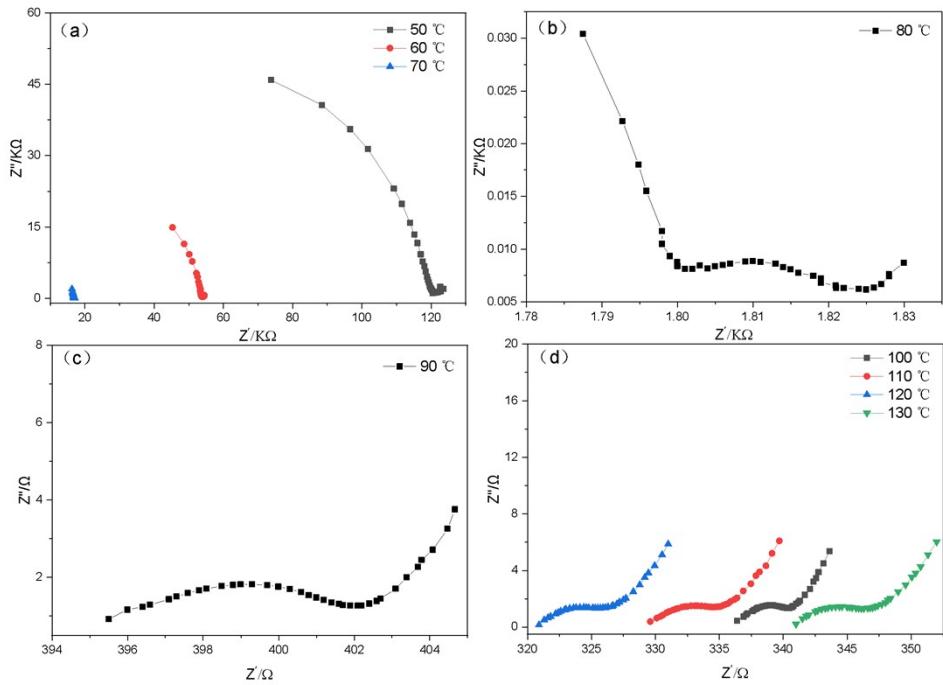


Fig.S7 Impedance spectra of Im@MC-12

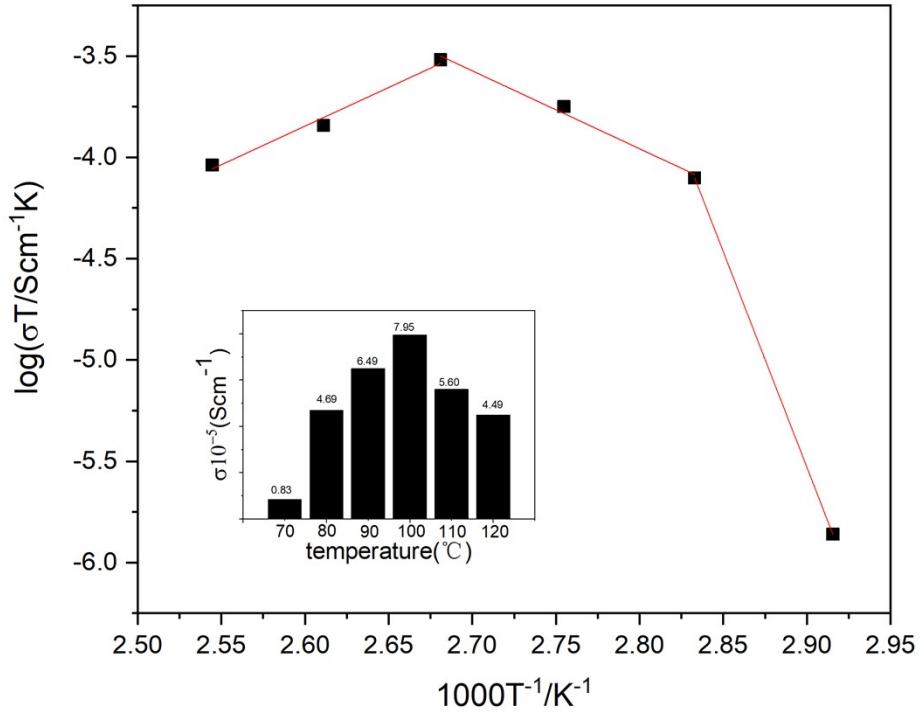


Fig.S8 Proton conductivity of Im@TAPB-DMTP-COF

Table S2 Comparison of proton conductivity of related materials

Materials	Structures	Method	σ (S/cm)	E (eV)	Ref.
Im@MC-31	3D	Post loaded method	1.40×10^{-2} (120 °C, 0 % RH)	0.14	This work
Im@TPB-DMTP-COF	2D	Post loaded method	4.37×10^{-3} (130 °C, 0 % RH)	0.21	1
Im@Tp-DADMB	2D	Post loaded method	2.40×10^{-3} (130 °C, 0 % RH)	0.16	2
Im@Py-TT-COF-50	2D	Post loaded method	3.08×10^{-3} (130 °C, 0 % RH)	0.36	3
Im@CuBTC	3D	Post loaded method	1.04×10^{-4} (70 °C, 0 % RH)	-	4
{Al(μ 2-OH)(1,4-ndc)} _n Im	3D	Post loaded method	2.20×10^{-5} (120 °C, 0 % RH)	0.60	5
Imidazole@UiO-67	3D	Post loaded method	1.44×10^{-3} (120 °C, 0 % RH)	0.36	6
Tz@b-PCMOF-2	2D	Post loaded method	2.50×10^{-3} (150 °C, 0 % RH)	0.34	7
His@Al(m2-OH)(1,4-bdc)	3D	Post loaded method	1.70×10^{-3} (150 °C, 0 % RH)	0.25	8
PA@Tp-Azo	2D	H ₃ PO ₄ loaded	6.70×10^{-5} (67 °C, 0 % RH)	-	9

PA@TpBpy-MC	2D	H ₃ PO ₄ loaded	2.50 × 10 ⁻³ (120 °C, 0 % RH)	0.11	10
phytic@TpPa- (SO ₃ H-Py)	2D	Phytic acid loaded	3.00 × 10 ⁻⁴ (120 °C, 0 % RH)	0.16	11
SO ₃ H-IL-PMo ₁₂ @MIL-101	3D	Post loaded method	5.57 × 10 ⁻² (70 °C, 70 % RH)	0.36	12
Im@MOF-808	3D	Post loaded method	3.45 × 10 ⁻² (65 °C, 99 % RH)	0.25	13
Im@s-PMO	3D	Post loaded method	7.11 × 10 ⁻³ (180 °C, 0 % RH)	-	14
PIL-TB-COF	2D	[PSMIm] [HSO ₄] anchored	2.21 × 10 ⁻³ (120 °C, 0 % RH)	0.30	15

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