

# Supporting Information

## Proton Conducting Self-Assembled MOF/Polyelectrolyte Hollow Hybrid Nanostructures

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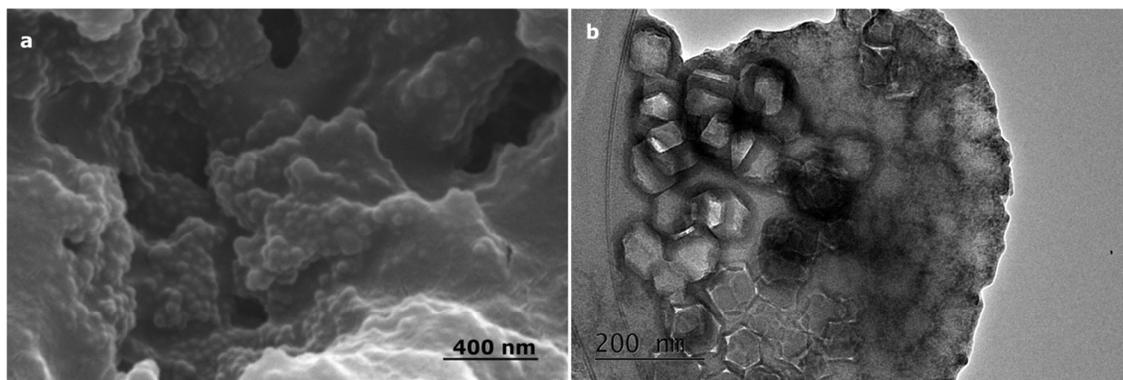
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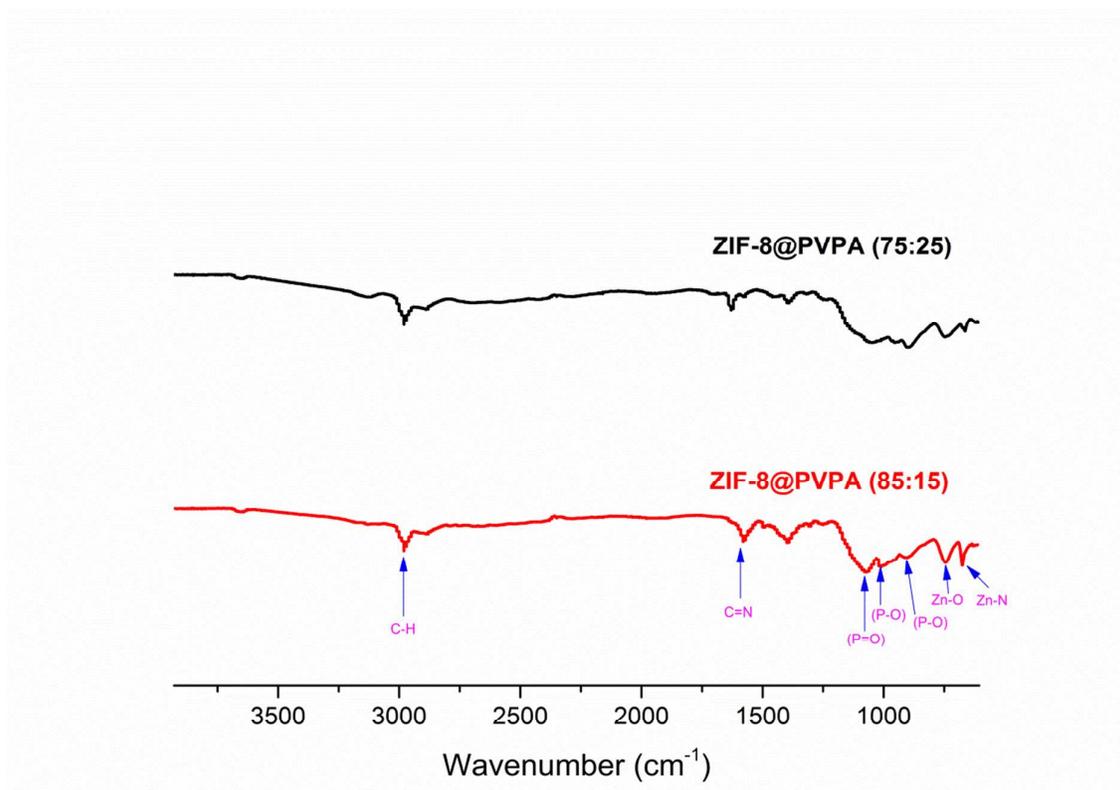
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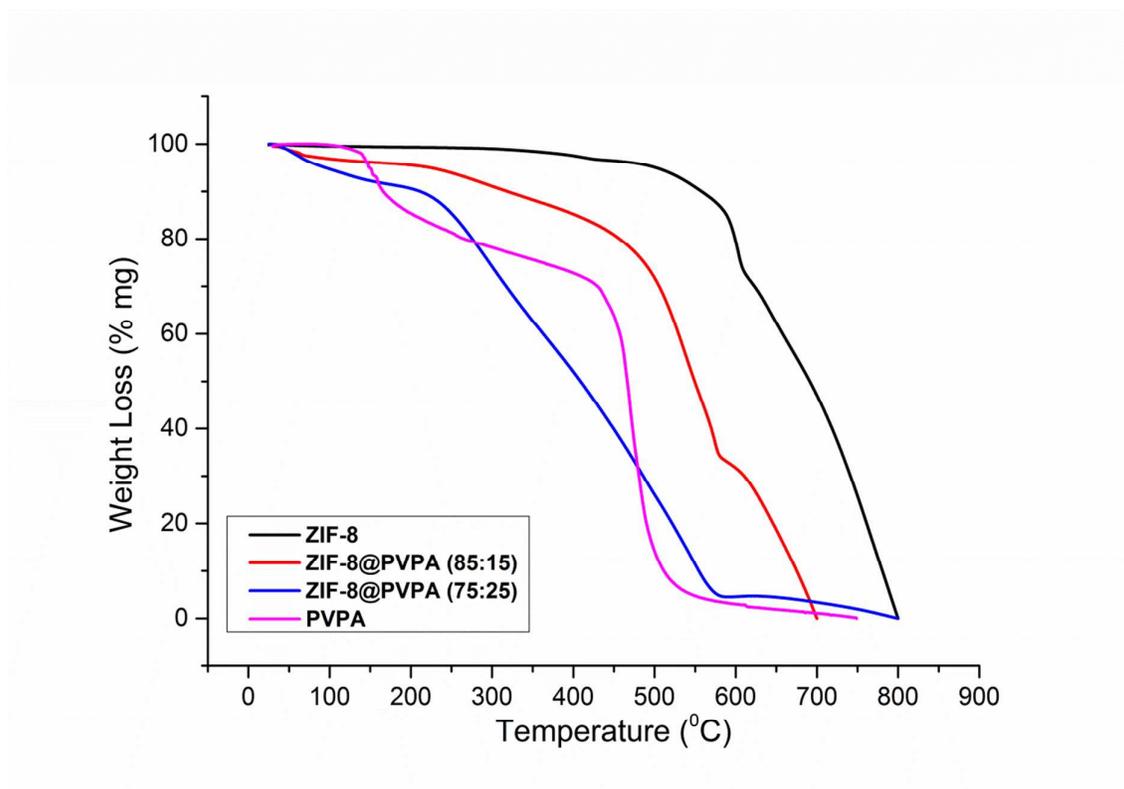
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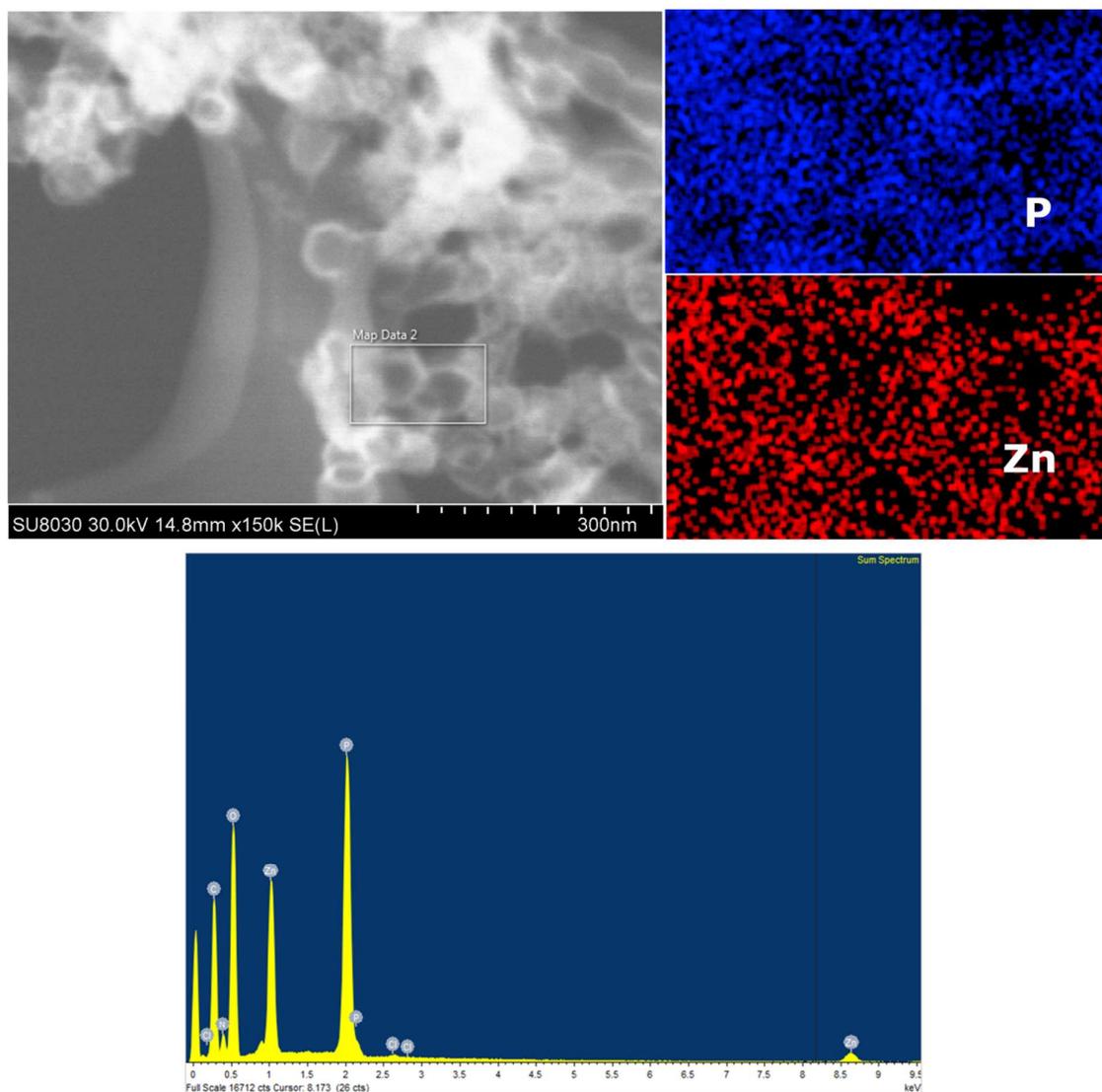
**Figure S1.** (a) SEM, (b) TEM images of ZIF-8@PVPA (65:35)



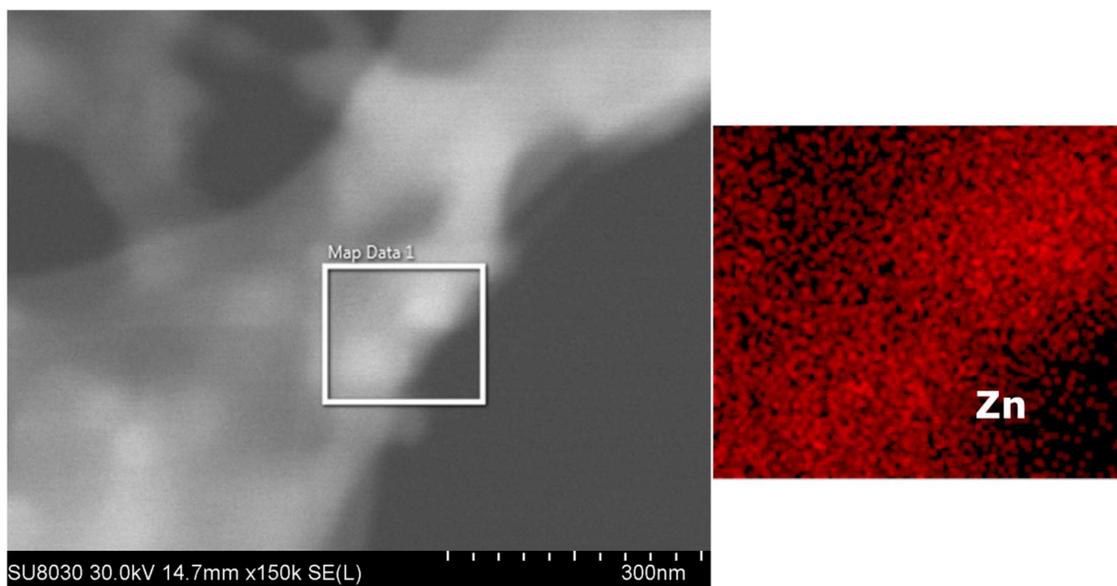
**Figure S2.** FT-IR Spectra of ZIF-8@PVPA (85:15) and (85:25)



**Figure S3.** TGA thermograms of the ZIF-8 NPs, neat PVPA and ZIF-8@PVPA hollow nanostructures

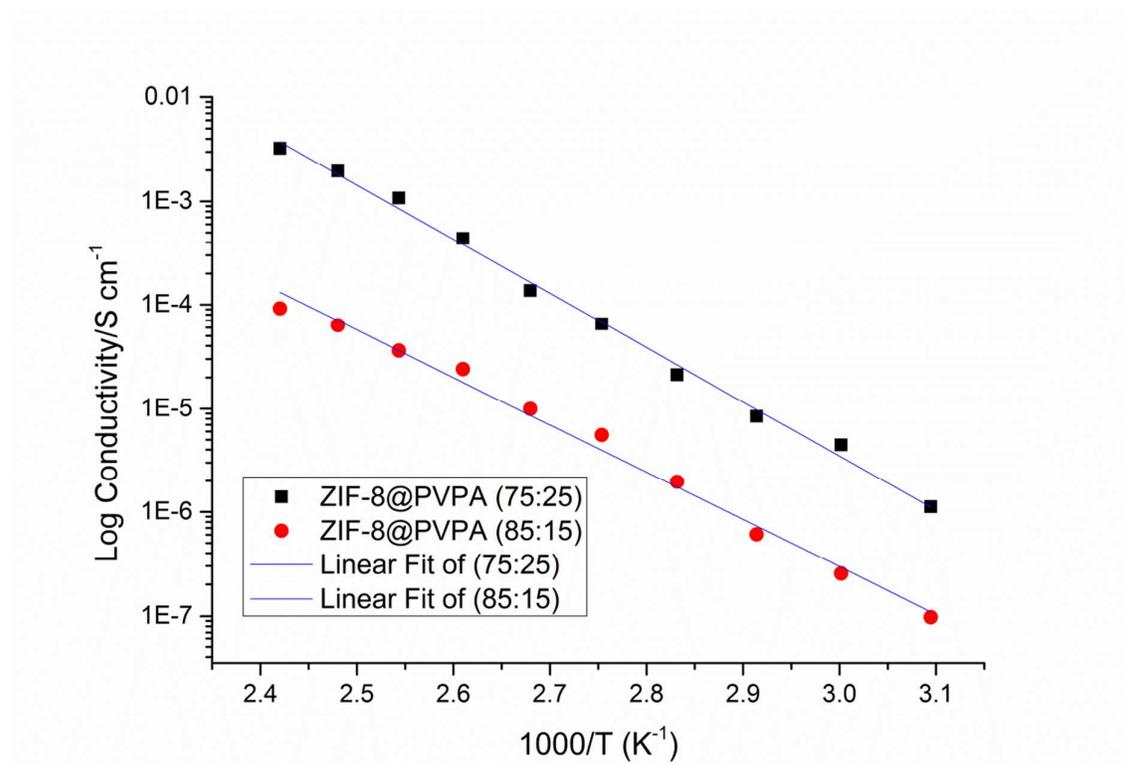


**Figure S4.** Element mapping and EDS of ZIF-8@PVPA (85:15) showing the existence of P and Zn.



**Figure S5.** Element mapping of pure ZIF-8 showing the existence Zn.

## Calculation of activation energy from Arrhenius equation



**Figure S6.** Linear fitted Arrhenius plots.

Equation	$y = a + b*x$		
Weight	No Weighting		
Residual Sum of Squares	0.0523592313216008	0.0837164924138383	
Pearson's r	-0.997932309510015	-0.995677772326662	
Adj. R-Square	0.995352506159498	0.990296004593571	
		Value	Standard Error
(75:25)	Intercept	10.2353049305202	0.326576692055748
	Slope	-5.47961546128311	0.119126673274304
(85:15)	Intercept	7.17456507303643	0.412946763395668
	Slope	-4.50287154822441	0.15063222624081

$$\sigma = \sigma_0 \exp\left(\frac{E_{a,cond}}{RT}\right)$$

$$\ln \sigma = \ln \sigma_0 - \left(\frac{E_{a,cond}}{RT}\right)$$

The slope of plot is equal to  $-(E_a/R)$

So,

$$E_a = -R \times \text{Slope and } R = 8,3144621 \text{ J K}^{-1} \text{ mol}^{-1}$$

From there,

$$E_{a, 75:25} = 45.72 \text{ kJ mol}^{-1} (0.47 \text{ eV})$$

$$E_{a, 85:15} = 37.50 \text{ kJ mol}^{-1} (0.39 \text{ eV})$$