

# Unleashing and Harnessing Capacity of Diffusion Dominant Process by CoNi-ZIF for Energy Density Asymmetric Supercapacitor

Shankar. J<sup>a</sup>, Aisha Siddiqua<sup>a</sup>, H M Veereshappa<sup>a</sup>, Shubhankar Kumar Bose<sup>b</sup>, Prashanth W. Menezes<sup>c</sup>  
D.H. Nagaraju<sup>a,\*</sup>

<sup>a</sup> Department of Chemistry, School of Applied Sciences, REVA University, Bangalore-560064, India.

<sup>b</sup> Centre for Nano and Material Sciences, Jain University, Jain Global Campus, Kanakapura, Ramanagaram, Bangalore, 562112, India.

<sup>c</sup> Department of Materials Chemistry for Catalysis, Helmholtz-Zentrum Berlin für Materialien und Energie, Albert-Einstein-Str. 15, 12489 Berlin, Germany.

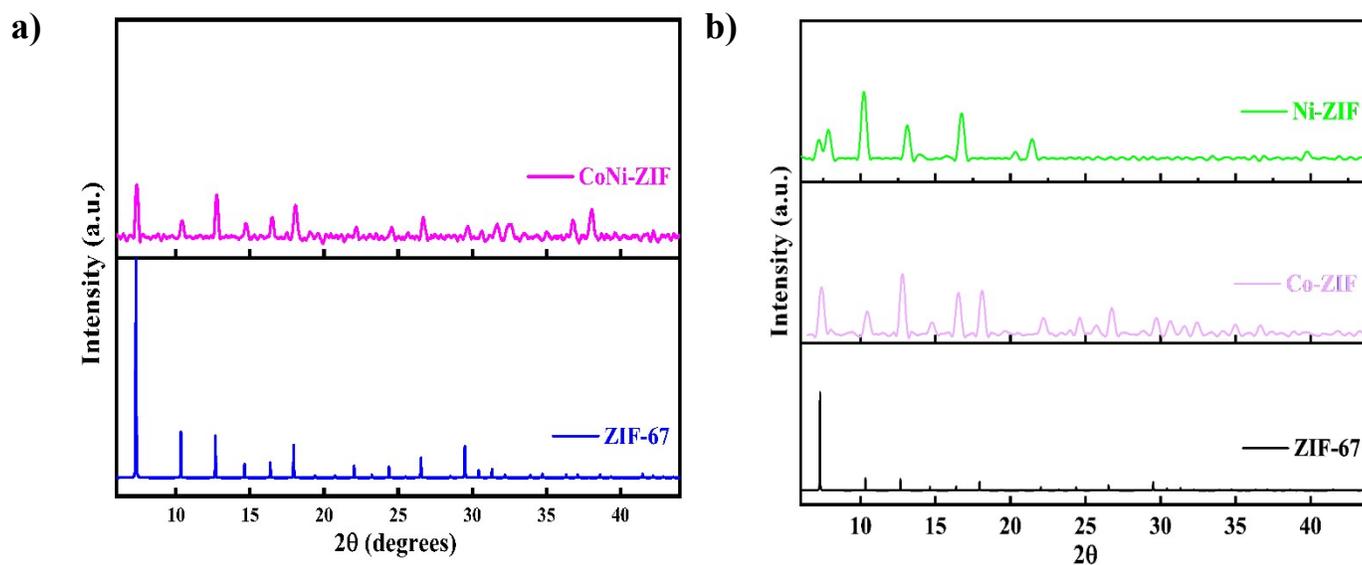
**Table 1:** Specific capacitance, Energy density and Power density of Co-ZIF, Ni-ZIF, CoNi-ZIF and CoNi-ZIF//AC in three and two-electrode configuration.

Materials	Current density (A g <sup>-1</sup> )	Specific capacity mAh g <sup>-1</sup>	Energy density Wh kg <sup>-1</sup>	Power density W kg <sup>-1</sup>
Co-ZIF	1	38.03	5.75	151.16
	2	35.68	5.39	302.05
	3	32.46	4.90	452.77
	4	30.83	4.66	604.54
	5	29.09	4.39	754.36
	10	22.83	3.45	1510.94
Ni-ZIF	1	18.22	2.75	150.89
	2	15.51	2.34	301.61
	3	14.40	2.17	442.60
	4	10.54	1.59	603.16
	5	5.90	0.89	753.88
	10	4.86	0.73	1512.15

CoNi-ZIF	1	49.06	26.65	536
	2	36.90	20.57	1100
	3	32.96	18.15	1650
	4	30.38	16.69	2185
	5	29.00	15.79	2747
	10	24.25	13.11	5406
CoNi-ZIF//AC	1	54.9	17.04	1241.53
	2	45.51	14.13	2483.78
	3	39.30	12.20	3725.19
	4	35.24	10.94	4966.45
	5	31.5	9.78	6209.52
	10	22.77	7.07	12,415.60

**Figure: S1**

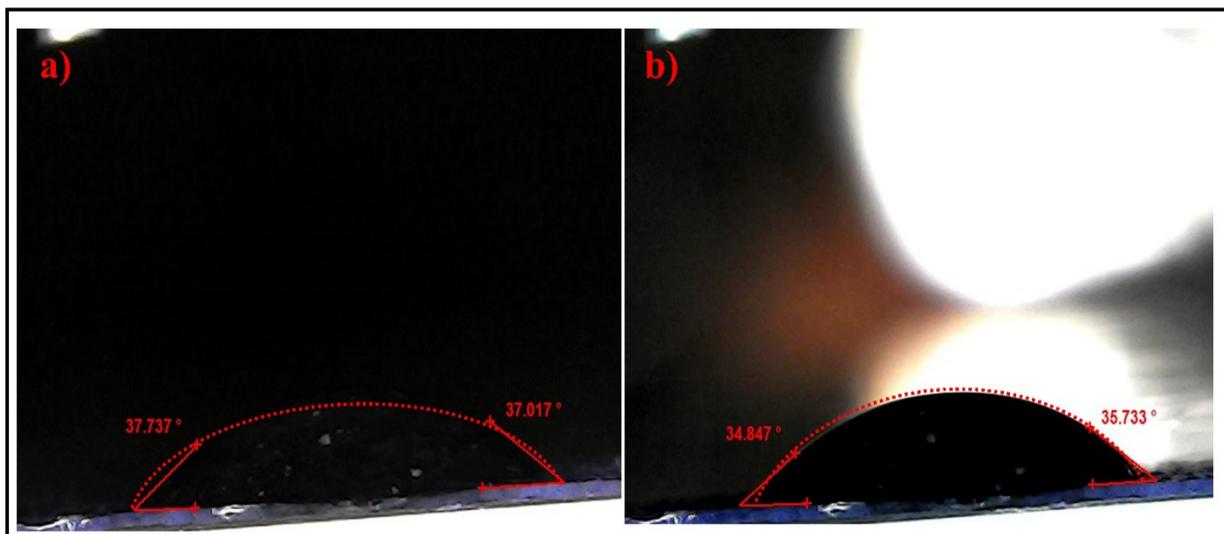
Powder x-ray diffraction of Co-ZIF, Ni-ZIF, and CoNi-ZIF with simulated ZIF-67.



**Fig.** a) XRD patterns of CoNi-ZIF, b) XRD patterns Co and Ni-ZIF with simulated ZIF-67.

**Figure: S2**

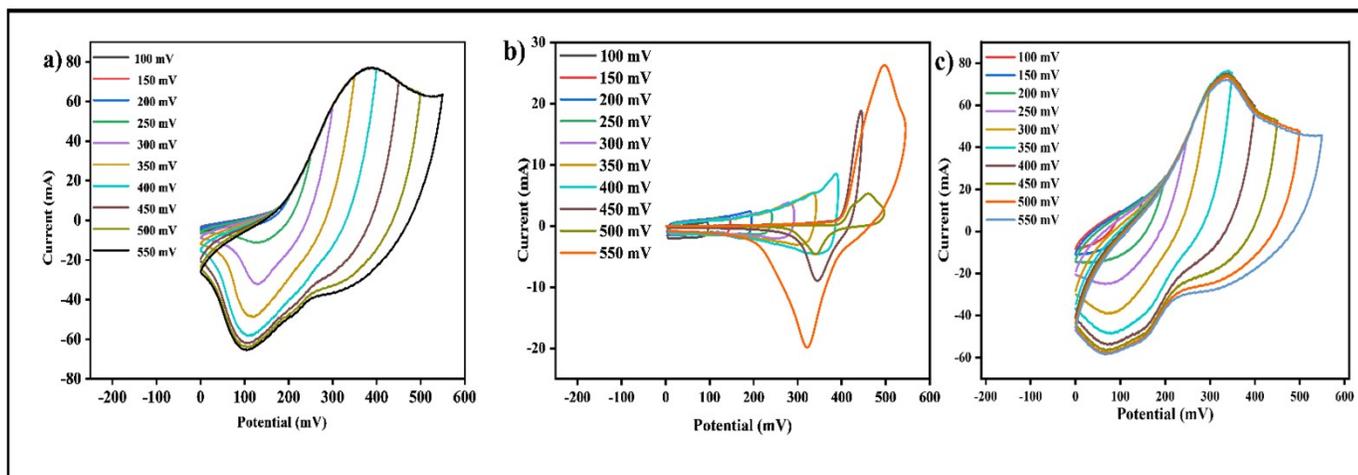
Hydrophilicity measurements was carried out by contact angle technique for CoNi-ZIF



**Fig.** (a and b) Contact angle measurements of CoNi-ZIF.

**Figure: S3**

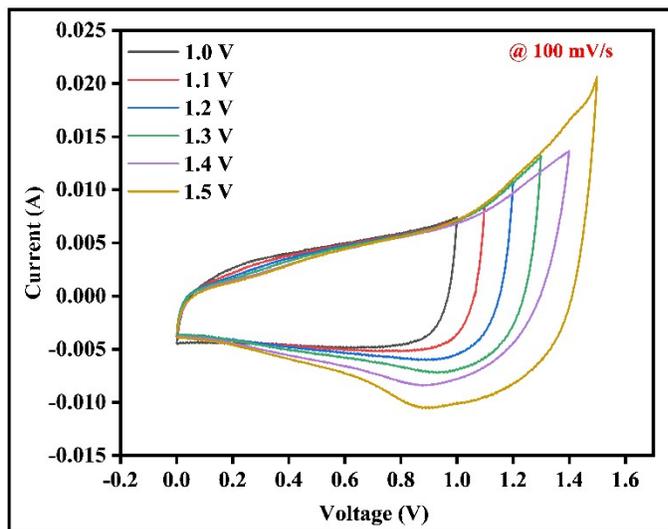
Optimization of potential window for Co-ZIF, Ni-ZIF and CoNi-ZIF using CV technique in a three-electrode configuration.



**Fig.** (a, b, and c) CV profiles of Co-ZIF, Ni-ZIF and CoNi-ZIF at various potential window

**Figure: S4**

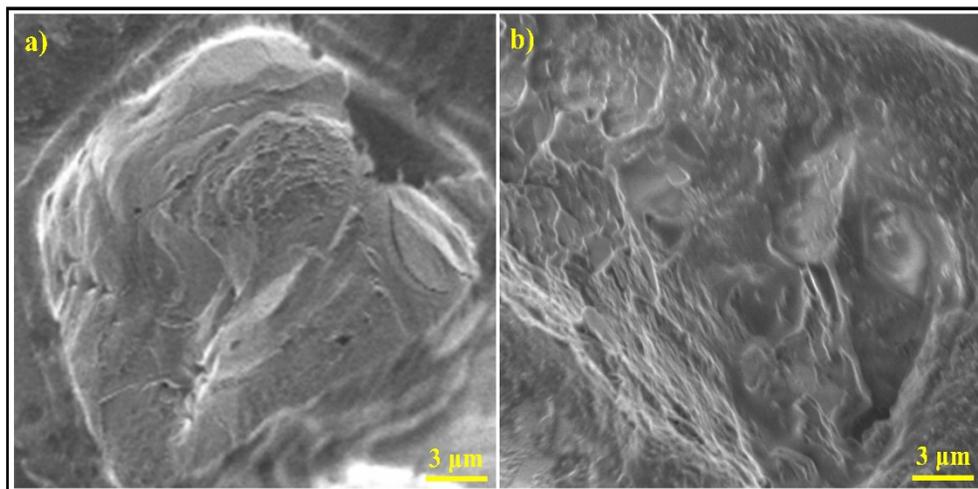
Optimization of potential window for CoNi-ZIF//AC using CV technique in a two-electrode configuration



**Fig.** CV profile of CoNi-ZIF//AC at different potential window.

**Figure: S5**

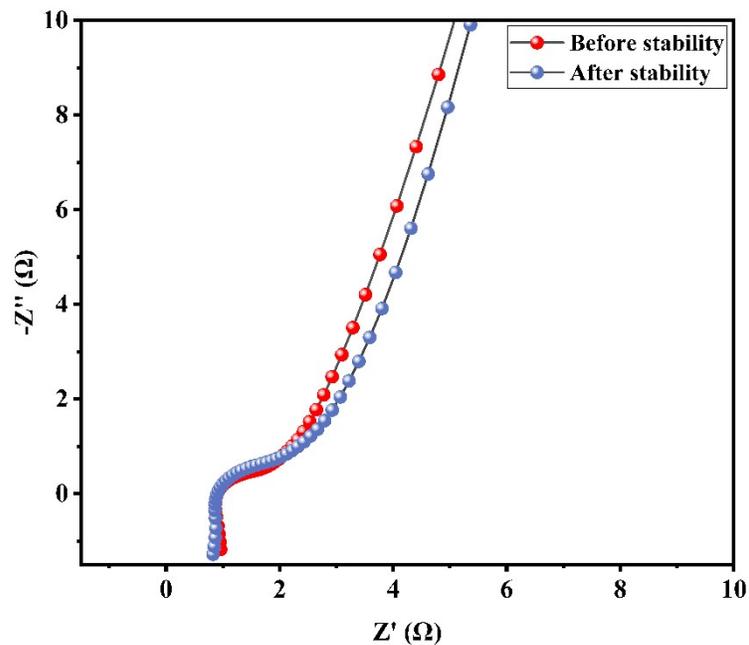
SEM analysis of electrode before and after GCD stability of 10,000 cycles



(a) SEM image of CoNi-ZIF before stability, (b) SEM images of CoNi-ZIF after stability.

**Figure: S6**

Nyquist plots of CoNi-ZIF//AC device before and after GCD stability of 10,000 cycles



**Fig.** Nyquist plot of CoNi-ZIF//AC before and after stability

**Figure: S7**

Specific Capacity of CoNi-ZIF//AC device

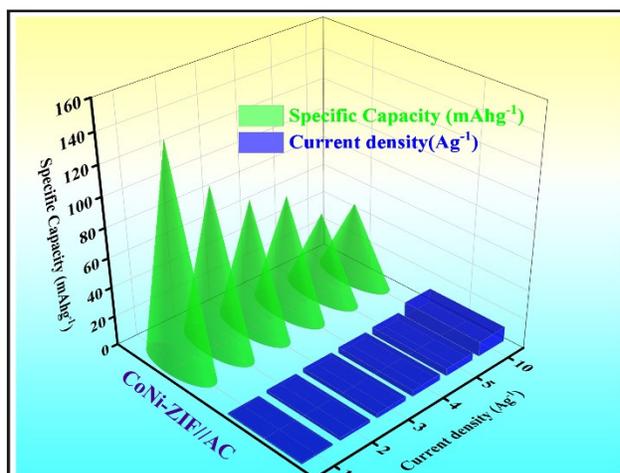
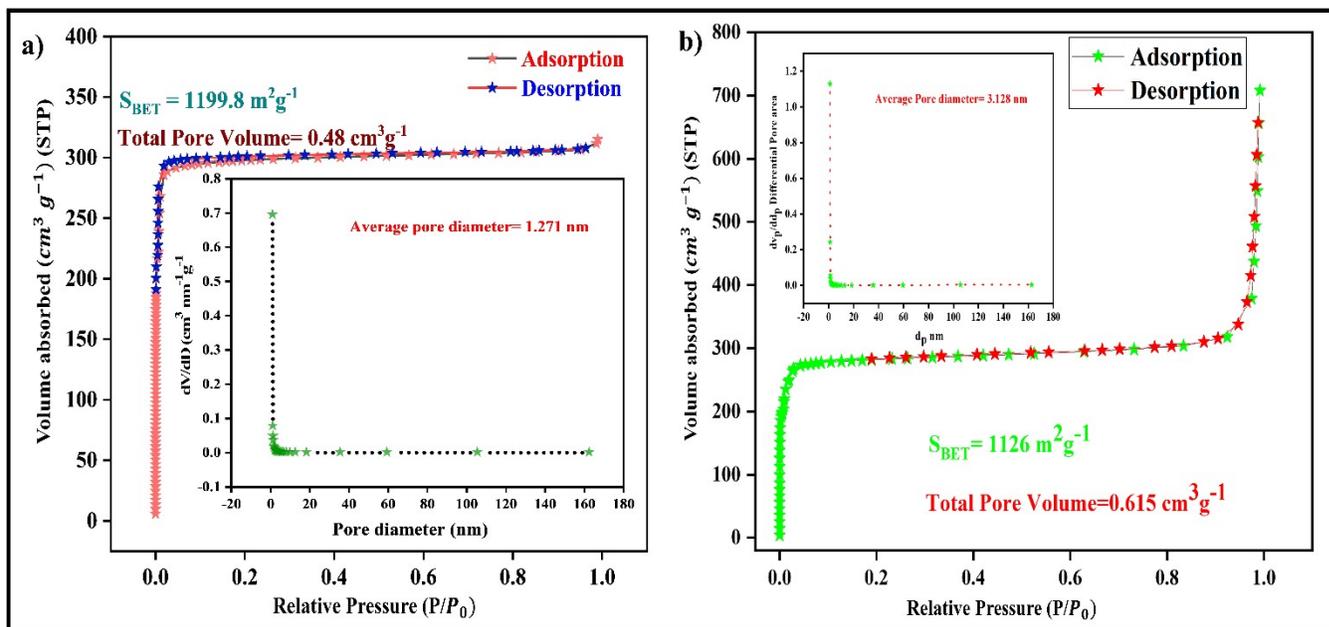


Figure: S8



a) BET and BJH studies of Pristine Co-ZIF, b) BET and BJH studies of CoNi-ZIF