Supplementary information

Exploring the Potential of ZIF-8@MCM-41-based Heterostructured Material for Battery-Type Electrodes for Supercapatteries

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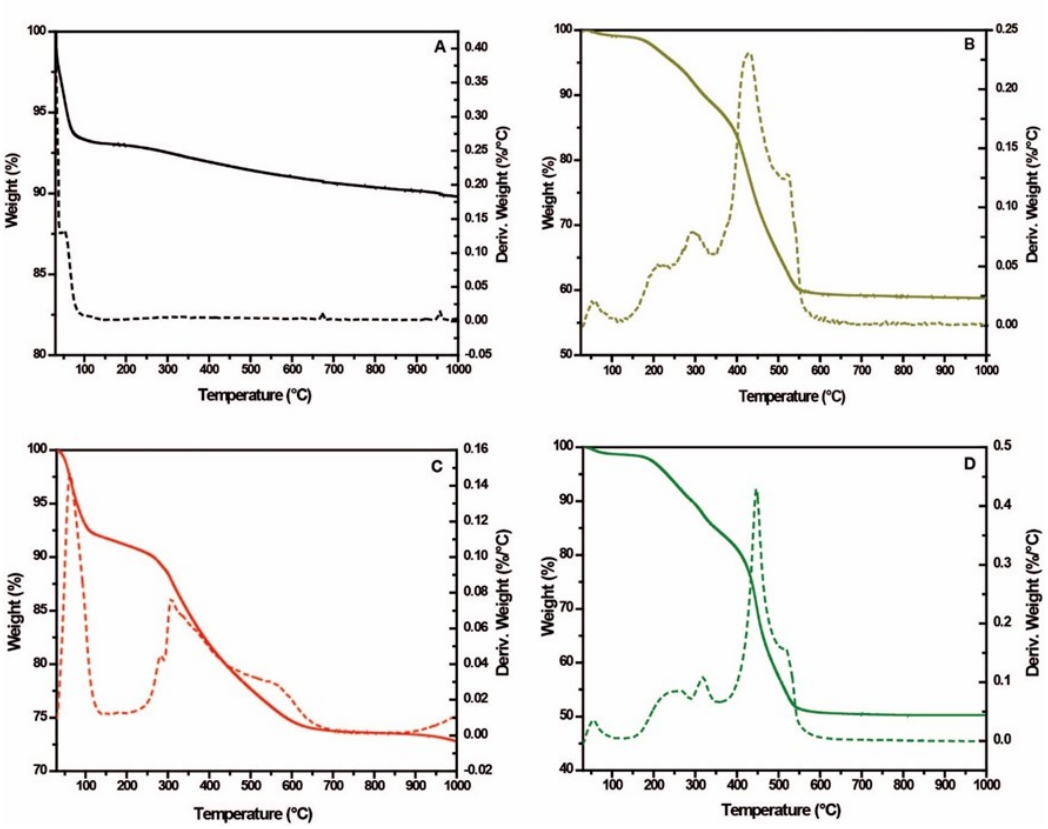

Figure S1. TG curves recorded under air-flow conditions for the A) MCM-41, B) ZIF-8, C) NH2-MCM-41, and D) ZIF-8@NH-MCM-41 samples.

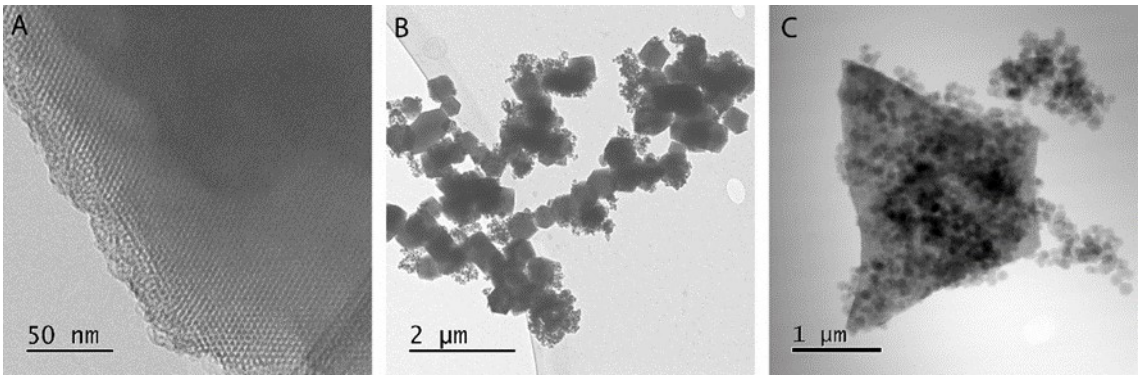

Figure S2. TEM images of A) MCM-41, B) ZIF-8, and C) ZIF-8@NH-MCM-41.

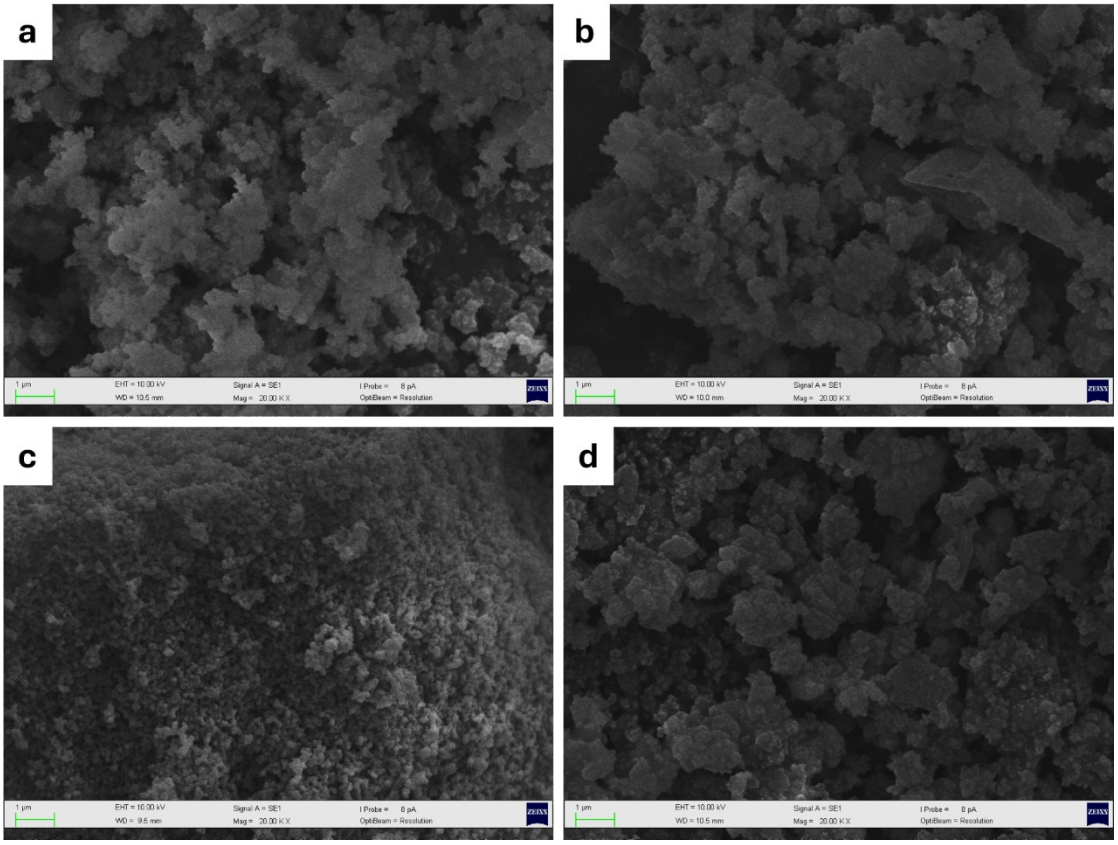

Figure S3. SEM images of (a) MCM-41 , (b) NH2-MCM-41, (c) ZIF-8, (d) ZIF-8@NH-MCM-41 samples. Under 20 kx of magnification.

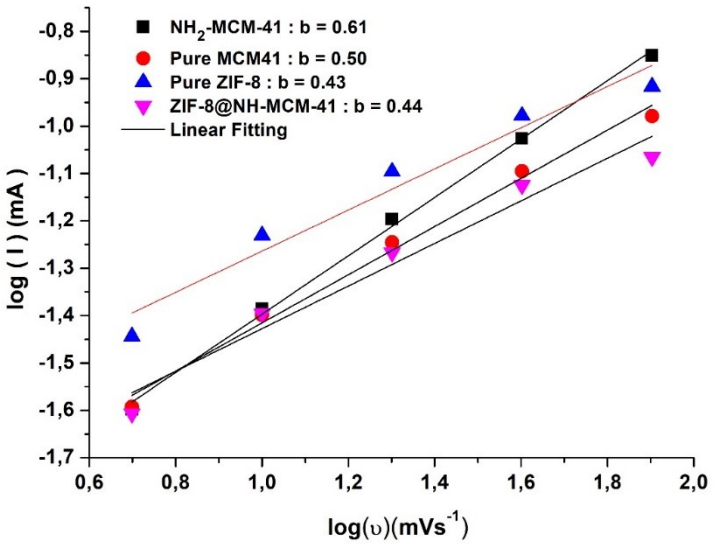

Figure S4. Plot of log ν against log i for all the materials.

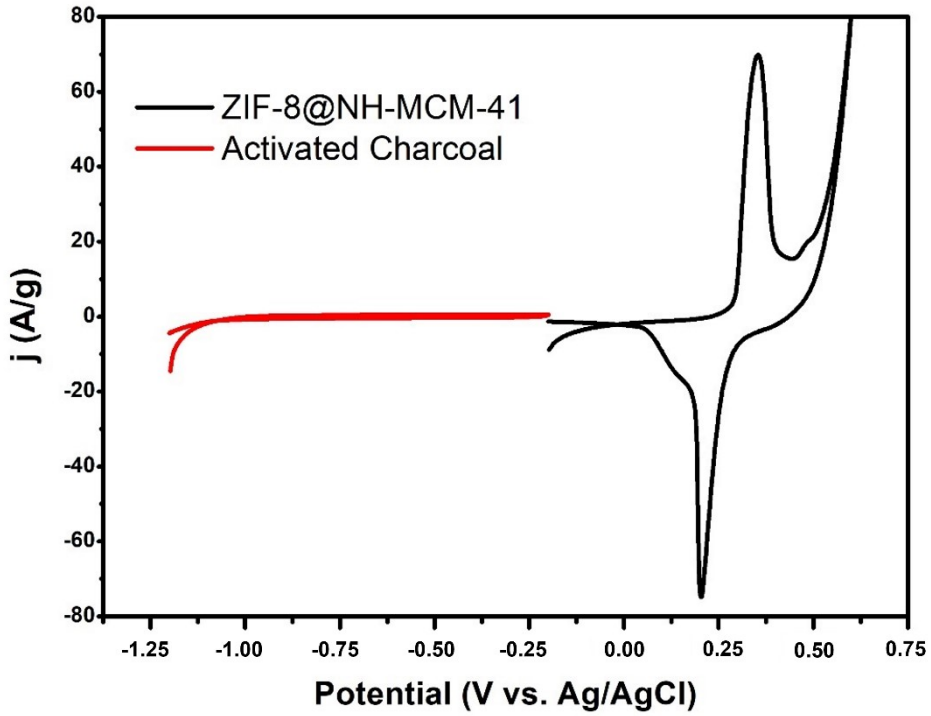

Figure S5. CV spectrum of the AC and ZIF-8@NH-MCM-41 material at 5 mV s^{-1}.

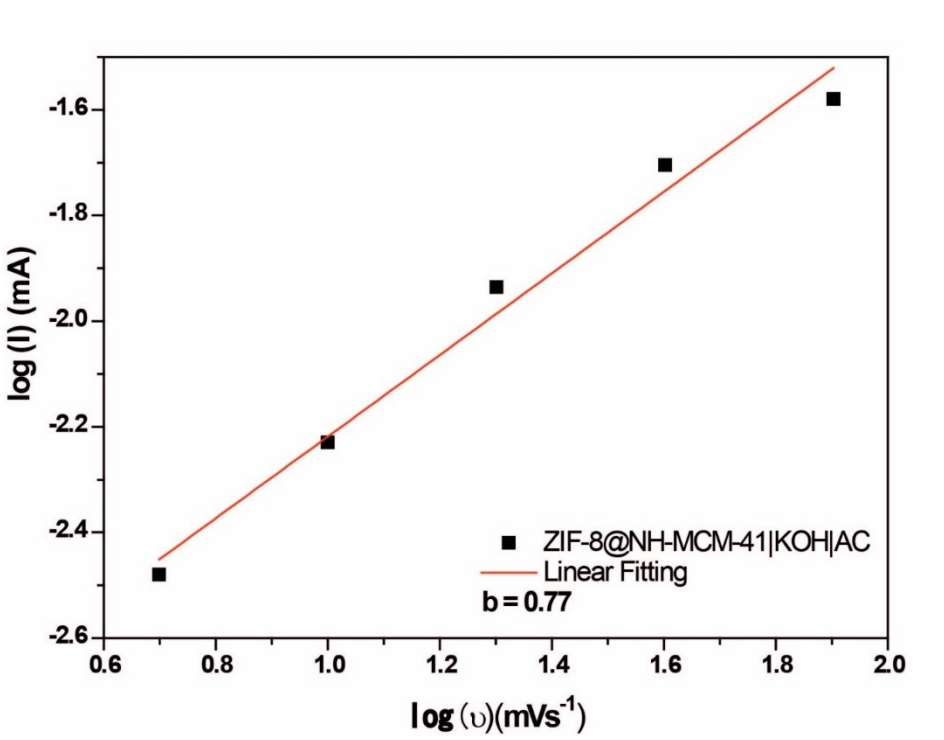

Figure S6. Plot of log ν against log i for the asymmetric supercapacitor cell.

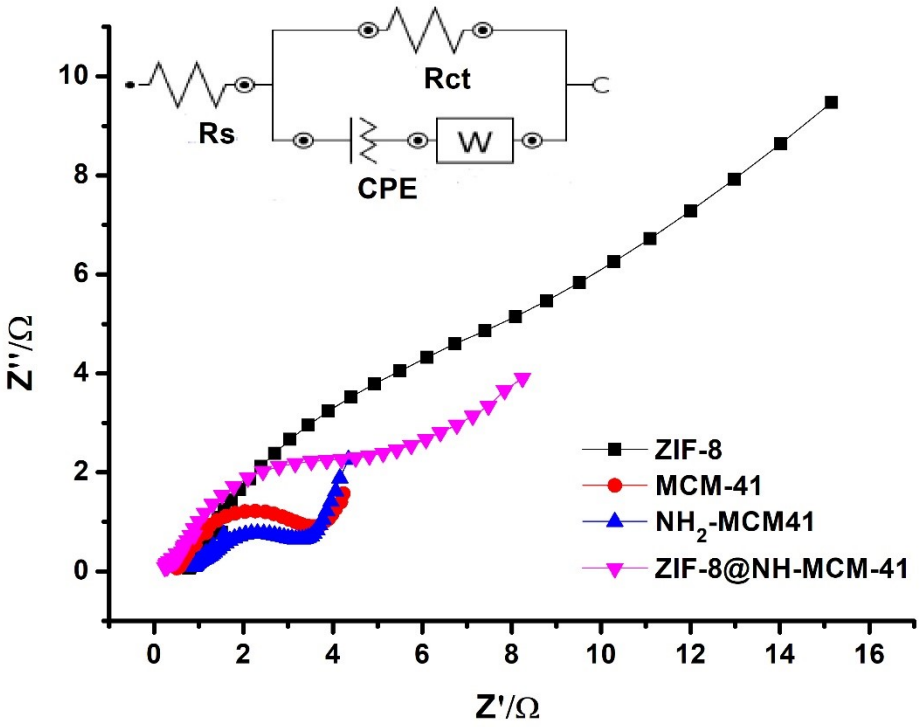

Figure S7. A) EIS Nyquist diagram. *Inset* shows the equivalent circuit used for the fitting impedance spectra

Table S1. Specific capacitance and coulombic efficiency at different current densities of MCM-41, NH_2-MCM-41, ZIF-8, and ZIF-8@NH-MCM-41.

NH_2-MCM41			MCM-41			ZIF-8			ZIF-8@NH-MCM-41		
Current Density A g-1	Specific Capacitance F g^{-1}	Coulombic Efficiency n%	Current Density A g-1	Specific Capacitance F g^{-1}	Coulombic Efficiency n%	Current Density A g^{-1}	Specific Capacitance F g^{-1}	Coulombic Efficiency n%	Current Density A g^{-1}	Specific Capacitance F g^{-1}	Coulombic Efficiency n%
1	2251.21	66.88	1	2656.09	91.97	1	1395.23	75.18	1	3245.56	95.52
2	1878.04	74.90	2	2302.43	82.66	2	1109.523	81.46	2	2582.27	72.96
4	1717.07	84.21	4	2039.02	86.7	4	1009.523	86.88	4	2318.98	83.57
6	1639.02	89.6	6	1858.53	90.07	6	928.571	89.04	6	2156.96	87.11
8	1560.97	90.9	8	1736.58	92.7	8	876.19	92	8	2025.31	90.09
10	1512.19	92.5	10	1658.53	94.44	10	833.333	94.59	10	1898.73	89.28

Table S2. Specific Capacity, Specific capacitance, Power Density and Energy density Asymmetric Supercapacitor Cell (ASCs).

ZIF-8@NH-MCM-41||KOH||AC				
Current Density A g-1	Specific Capacity mAh g^{-1}	Specific Capacitance F g^{-1}	Power Density W kg^{-1}	Energy Density Wh kg^{-1}
1	15.55	31.6	495	7.7
2	12.22	24.8	998.1	6.1
4	8.88	18	1980	4.4
6	6.66	13.5	2970	3.3
8	6.6	13.5	3960	3.3
10	5.5	11.3	4860	2.7