Abstract

Metal organic frameworks (MOFs), new porous materials having multifunctional capabilities and flexible nano geometries, are emerging as a promising candidate to improve performance of sustainable energy storage technologies. MOF premised of transition metals (Ni, Co, and Zn) are synthesized by hydrothermal method with trimesic acid (TMA) as an organic ligand. Different structures of Ni/Co/Zn-MOFs may be produced by adjusting the molar ratio of the Ni ion by percentage of 25, 50, and 75, the desired sample with 75% Ni exhibits the best porous structure and has the highest specific surface area. Among the analyzed MOFs, R75 MOF exhibits the highest specific capacitance of 335 F/g at scan rate of 5mV/s and 230 F/g at 0.2 A/g current density in three electrode assembly (1M KOH). The significantly improved electrochemical effects of Ni-Co-Zn MOFs emphasize its potential as a battery-type electrode material in supercapattery devices. Overall, this distinctive structure of MOFs-based materials would help in addressing the world's rising demand for sustainable energy.