

Abstract

The advancement in useful and flexible energy storage devices and associated materials has gained attention in the modern world due to rapid consumption of energy and need globally. Metal organic Frameworks is formed by interaction of metal center bonds with an organic linker. Frameworks containing organic cobalt metal are an excellent category of hybrid porous substances gaining significant interest in the past decade. Cobalt based metal organic Frameworks (Co-MOF) has greater surface areas, highly porous, less costly and method of preparation is simple. Here, reported the synthesis of cobalt based metal organic Frameworks and their application in energy storage devices. The Co-MOF was synthesized using cobalt nitrate hexahydrate as metal salt, isophthalic acid as ligand and co-ligand was 1,10-Phenanthroline through sonication method. The synthesized MOF was characterized by Fourier Transform Infrared Spectroscopy (FT-IR) and three electrode assembly was used for electrochemical analysis. The CV of MOF showed pseudo-capacitor like behavior because the b-value of slope was 0.65 and R^2 was 0.99 which shows the good reversibility of the material. Dunn's method was used to analyze the capacitive and diffusive contribution. The Co-MOF exhibited the specific capacity and specific capacitance of 22.4 C/g at 0.3 A/g and 56.2 F/g respectively. The EIS showed the ESR value of 1.39 Ω and R_{ct} value is 0.61 Ω . The study ensures that the prepared Co-MOF is promising material in pseudo-capacitor energy storage devices.