

ABSTRACT

For the development of high performance, ecofriendly, lowcost energy storage technology on a broad scale, modern scientists are engaged to industrialize the product as its high demands in portable and wearable electronic system. Most of the cases the materials are suffering from its low specific capacitance, low energy density and low power density. So, we have to develop one kind of device which has high specific capacitance with high energy density and robust power density. Various kinds of energy storage unit are already reported and none of them are suitable for all practical applications. Mostly used energy storage systems are capacitor and battery. Both have several disadvantages for portable electronic system as well as heavy electric vehicles. Capacitor provides high power density but it is suffering from low energy density. On the other hand, Battery offers high energy density but fails to deliver high power density. It will be better if one system is possible having both the properties as capacitor and battery. Supercapacitor is such kind of devices which can fulfill our aim with improving its performance by combining all possible combinations of materials.

From this demand, different kinds of materials are combined and have got successful result for the development of supercapacitor technology. The mostly used materials are graphene and carbon nanotube. The successful attempts have been made by combining metal oxide with conducting polymer and graphene/carbon nanotube. To get different types of crystal/morphological structures with enhanced surface area, the different conditions are applied on the synthesis procedure. The composites exhibit improved conductivity, enhanced surface area, high specific capacitance, high energy density with high power density and high cyclic stability.