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Carbon nanotube- and graphene-based nanomaterials and applications in high-voltage supercapacitor: A review

Zhoufei Yang, Jiarui Tian, Zefang Yin, Chaojie Cui, Weizhong Qian, Fei Wei



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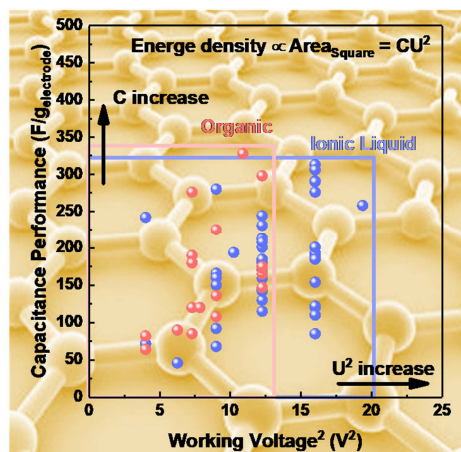
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The use of carbon nanotube- and graphene- based nanomaterials as the high-performance electrode is supposed to be one of a promising direction to develop high-voltage supercapacitor with both high power density and high energy density. In this review, the chemical vapor deposition and the exfoliation methods for the large-scale preparation of carbon nanotube, graphene and their hybrids were reviewed, and the purification methods to remove metal impurities and oxygen-containing functional groups were introduced. Then the capacitance performance of the carbon nanotube/graphene-based nanomaterials in electrolytes of high voltage window was discussed, including the comparison with the organic electrolyte and the discussion of low-temperature performance. The methods in fabricating supercapacitor device including the intake of excess liquids, the densification of carbon nanotube/graphene-based electrode and the reduction of resistance of supercapacitor are also addressed.

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