Graphene oxide induced rapid synthesis of α-MnO$_2$ nanorod and the electrochemical performance

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α-MnO$_2$ nanorods were rapid prepared by hydrothermal treatment of KMnO$_4$, GO (graphene oxide) and sulfuric acid at 120 °C for 3 h. The nanorods have a diameter of 10~20 nm and a length of 300~400 nm. The introduction of GO reduces the preparation temperature of α-MnO$_2$ nanorods and shorten the reaction time. The electrochemical results indicate that α-MnO$_2$ nanorods show fine capacitive behavior in neutral aqueous electrolyte (1 mol·L$^{-1}$ Na$_2$SO$_4$). When the scan rates were 2 mV·s$^{-1}$ and 5 mV·s$^{-1}$, the specific capacitances were 276 F·g$^{-1}$ and 240 F·g$^{-1}$, respectively. This α-MnO$_2$ nanorods is a potential electrode material for electrochemical capacitors.

References

Figure 1, α-MnO$_2$ that hydrothermal treated at different times with/without the addition of GO. (a) XRD patterns; (b) Raman spectrum

Figure 2, (a) Galvanostatic charge/discharge curves at different current density (inset was the cycle life at current density of 1 mA·cm$^{-2}$), (b) Nyquist plots of α-MnO$_2$ nanorods prepared by hydrothermal treatment at 120 °C for 3hrs