

Effects of sodium hydroxide on the yield and electrochemical performance of sulfonated poly(ether-ether-ketone) functionalized graphene

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The mass ratios of SPG1 and SPG2 that collected after centrifugation with respect to the mass of the graphite anode was as follows:

(a) The corroded mass of graphite anode in the case of SPG1 = The masses of collected SPG1 after 10 hours exfoliation (without centrifugation) = 427 mg

(b) The mass of the SPG1 that collected after centrifugation = The masses of collected SPG1 after 10 hours exfoliation followed by centrifugation = 26 mg

(c) The corroded mass of graphite anode in the case of SPG2 = The masses of collected SPG2 after 10 hours exfoliation (without centrifugation) = 972 mg

(d) The mass of the SPG2 that collected after centrifugation = The masses of collected SPG2 after 10 hours exfoliation followed by centrifugation = 390 mg

Charge required for graphite exfoliation can be calculated using the equation, $Q = \text{Current (Amp)} \times \text{time (sec)}$.

(e) The charge required for the production of 26 mg SPG1 in 10 h = $11 \times 10^{-3} \times 3600 \times 10 = 396$ Coulomb

Thus, for the production of 1 g SPG1, charge required = 15230 Coulomb

(f) The charge needed for the production of 390 mg SPG2 in 10 h = $27 \times 10^{-3} \times 3600 \times 10 = 972$
Coulomb

Therefore, the charge required for the production of 1 g SPG2 = 2505 Coulomb

The mass ratios of SPG1 and SPG2 collected after centrifugation, SPG2/SPG1 = 15.00

The production yield = (Corroded mass of graphite rod/the mass of the functionalized graphene collected after centrifugation) $\times 100$.

Thus, the production yield for SPG1 = $(26/427) \times 100 = 6.08\%$

In case of SPG2, it is = $(390/972) \times 100 = 40.12\%$