Short Communication

Optimization of Production of Graphene Oxide by Electrochemical Exfoliation: A Response Surface Methodology Application

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Graphene is a two dimensional carbon sheet which is bonded in the hexagonal honeycomb lattice form. In this study, Graphene oxide were produced by electrochemical exfoliation technique and optimized using a response surface methodology application. This study was conducted to evaluate the effect of voltage and pH of H₂SO₄ solution on the mass of graphene flakes. The FESEM and XRD were applied to characterize the structure of produced graphene oxide flakes. The electrochemical impedance spectroscopy results indicated that the reduced graphene oxide had lower charge-transfer resistance. The optimization process was done via Central Composite Design presented in Design expert 10. The optimum conditions were found to be an applied voltage of 9.56 V, and a pH of 1.29. The production optimization using response surface methodology indicated that the combination of the lowest electrolyte pH and the highest voltage applied resulted in the highest mass produced.

Keywords: Graphene oxide; Electrochemical exfoliation; Response surface methodology; Central composite design

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