Predictive Modeling of Multilayer Graphene Growth by Chemical Vapour Deposition on Co-Ni/Al₂O₃ Substrate using Artificial Neural Network

Abstract - The uniqueness of multilayer graphene as extremely high carrier mobility, tune-able band gap and high elasticity has made it be considered as a high prospect engineering material that can be employed for several applications such as solar cells, field effect transistors, super-capacitors, batteries and sensors. In this study, the application of Artificial Neural Networks (ANN) for the predictive modeling of multilayer graphene (MLG) growth by chemical vapor deposition (CVD) on Co-Ni/Al₂O₃ substrate was investigated. Data comprises temperature, catalyst compositions, ethanol flowrates were generated using central composite experimental design and employed to obtain the MLG yield as the response. The data were subsequently used for predictive modeling using ANN. The findings show that the predictive values of the MLG yields were in good agreement with those obtained from the experimental runs having a coefficient of determination ($R^2$) of 0.988.

Keywords - Artificial Neural Network, Chemical Vapour Deposition, Multilayer Graphene, Predictive modeling, Cobalt-Nickel substrate.