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Study of quantum capacitance in N doped few layer graphene[1]
MEHMET KARAKAYA, JINGYI ZHU, RAMAKRISHNA PODILA, Clemson University, ANURAG SRIVASTAVA, IIITM- Gwalior, Madhya Pradesh, India, APPARAO RAO, Clemson University, DEPARTMENT OF PHYSICS AND ASTRONOMY, CLEMSON NANOMATERIALS CENTER, CLEMSON UNIVERSITY TEAM, IIITM- GWALIOR, MADHYA PRADESH, INDIA TEAM — The intrinsically small density of states at the Fermi level in graphene results in a small serial quantum capacitance C_Q, which diminishes the total device capacitance value (C_{tot}) in supercapacitors. In this work, we studied C_Q of N doped graphene in pyrrolic(N1), graphitic (N2) and pyridinic (N3) configurations. The observed C_Q value for sample N1 was significantly different from samples N2 and N3, as predicted by DFT calculations, thus implying that precisely engineered dopant configurations, rather than concentration, can enhance C_Q. Such approaches are pivotal for alleviating the existing bottlenecks in both graphene-based device scaling and supercapacitor electrode limitations.

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