

Structure of nitrogen-doped graphene synthesized by combination of imidazole and melamine solid precursors

ABSTRACT

Here, we demonstrate the synthesis of nitrogen-doped (N-doped) graphene using imidazole and melamine as two different nitrogen containing aromatic rings carbon precursors. Structure of N-doped graphene was investigated at different temperature (800–1020 °C) without changing the precursor quantity. It is observed that higher crystalline N-doped graphene can be obtained from the solid precursors at 1020 °C on Cu foil. X-ray photoelectron spectroscopy (XPS) analysis shows interesting features for the N-doped graphene synthesized from mixture of imidazole and melamine. Overall graphitic nitrogen content is enhanced in the graphene layers using the mixture of precursors, attributing better coordination of carbon and nitrogen atoms on Cu catalyst. Our finding shows that the graphitic and pyridinic nitrogen content in graphene lattice can be tuned by combination of two different nitrogen containing organic molecules.

Keyword: Carbon materials; Chemical vapor deposition; Structural; Crystal growth; XPS