Short Communication

Preparation of chemically reduced graphene using hydrazine hydrate as the reduction agent and its NO₂ sensitivity at room temperature

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Graphene oxide hydrogel was prepared from graphite oxide by a gel method and used as a precursor to obtain reduced graphene oxide (rGO) samples, which were prepared by reduction treatment of the graphene oxide (GO) using different levels of hydrazine hydrate dosage. The effects of hydrazine hydrate dosage on the structure, functional groups and gas-sensing properties of the GO samples were studied by means of X-ray diffraction (XRD), Raman spectroscopy (Raman), IR spectra (FT-IR) and a gas-sensing test. The results showed that with an increase in the amount of hydrazine hydrate, the oxygen-containing functional groups in the GO samples gradually disappeared, the degree of disorder (I_D/I_G) decreased from 1.59 to 1.22, and the resulting structure changed to a more orderly graphite-like structure. For a hydrazine hydrate dosage of 0.1 mL, GO was found to be almost completely reduced. The sensitivity of the samples to NO₂ detection showed a decreasing trend, while the response-recovery time showed an increasing trend. At room temperature, a sample prepared with a hydrazine hydrate dosage of 0.1 mL showed a static response sensitivity of 42.17%, response time of 123 s, and a recovery time of 295 s under a 100 ppm NO₂ environment.

Keywords: chemical reduction; rGO; room temperature; NO₂ detection

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