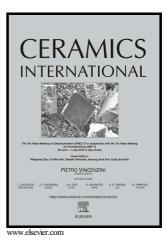
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Uniform Decoration of Silver Nanoparticle on Exfoliated Graphene Oxide Sheets and its Ammonia Gas Detection

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Abstract

Silver nanoparticles (AgNP) decorated graphene oxide (GO) sheets were prepared by reducing AgNO₃ with vitamin C in the presence of GO. Different molar concentration of AgNO₃ played a significant role in the size of AgNP in GO. The synthesized AgNP-GO composites were characterized by powder X-ray diffraction, scanning electron microscopy, ultraviolet–visible-near infrared, Fourier transform infrared and micro Raman spectroscopy techniques. We demonstrated the fiber optic gas sensor using reduced graphene oxide (rGO) and AgNP-GO composites for 0-500 ppm ammonia vapor concentrations at 27°C. Sensitivities of rGO, 0.1 M AgNP-GO and 0.6 M AgNP–GO composites coated fiber optic sensors were calculated as -0.08, -0.177, -0.12 counts/ppm respectively. The agglomeration of AgNP at 0.6 M concentration along with increased particle size significantly decreased the sensing performance.

Keywords: Graphene oxide, reduced graphene oxide, silver nanoparticles, fibre optic gas sensor, ammonia sensor, vitamin C.

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