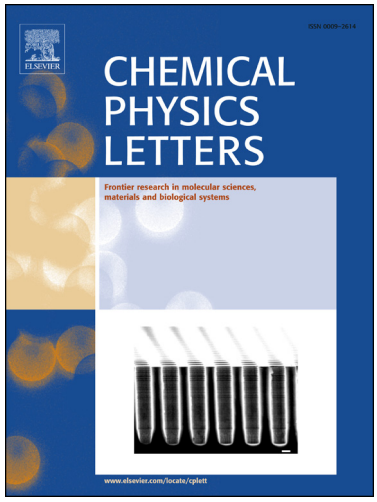

Thermally Reduced Solution-Processed Graphene Oxide Thin Film: An Efficient Infrared Photodetector

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ABSTRACT

A sharp response of infrared light detecting capability is observed in reduced graphene oxide based photodetector. The photoresponse increased with increasing solution concentration and annealing duration, at a low percolation. The photocurrent increases considerably before saturation and persists for a maximum time of 26 minutes. This study also reports on superiority of device performance with continuous annealing over annealing with an interval. A maximum photoresponsivity of 0.55 A/W and external quantum efficiency of 57% was achieved at low power light intensity (0.8 mW/cm^2). This study presents an efficient graphene oxide thin film infrared photodetector processed via a modified synthesis protocol.

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1. Introduction

Graphene, a two dimensional atomically thin carbon material and its derivative like graphene oxide (GO) have attracted much attention due to its remarkable electronic [1, 2] and optical properties [3]. Their applications in nano-electronics, nano-sensors and nano-bio engineering are of great interest in the industry [4, 5]. Infrared (IR) detection is a primary subject in optical sensing and is vital for a variety of military and scientific applications, including monitoring and controlling manufacturing process, optical communication, etc [6-8]. In the last decade, the synthesis and characterization of one-dimensional nanostructure of graphene, and its derivatives GO have been attracting special scientific and technological attention as future candidates for optoelectronic