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Abstract

Selenium nanospheres assembled by a large amount of nanocrystals (NCs) were facilely synthesized through in-situ reduction of graphene oxide (GO) using NaHSe as reducing agent as well as Se source. The structural and optical characterizations of these as-prepared products have been carried out at room temperature. The reduction of graphene oxide was accompanied by the deposition of Se nanospheres uniformly on the surface of reduced graphene oxide (RGO) sheets. Moreover, the product was found to exhibits orange red color luminescence under ultraviolet (UV) lamp for the first time with higher quantum yield (QY) of 8.11 %, which is six times higher than that of GO aqueous solution (1.32 %).

Keywords: Graphene oxide, Selenium, Luminescence, Nanocomposites, Quantum yield.

1. Introduction

As a novel two-dimensional (2D) carbon material, graphene [1] has drawn increasing attention due to its outstanding optical, chemical, physical properties and promising applications in electronics, energy storage and photovoltaic[2-4]. However, graphene is a zero-bandgap semiconductor, due to the lack of a bandgap, the possibility of observing obvious photoluminescence (PL) is also highly unlikely. Recently,