Synthesis and characterization of iron oxide nanoparticles doped three dimensional graphene foam

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Abstract

Three-dimensional (3D) graphene-based frameworks in the form of aerogels, hydrogels, sponges and foams are an important class of new-generation carbon materials [1]. Among them, graphene foam has appeared to be a promising and important prospect. Network structure of 3D graphene foams that allows the formation of a highly porous structure, makes it possible for this material to be doped with other polymer materials or other functional materials so that a hybrid material can be manufactured, thus expanding its areas of use [2]. Thanks to this ability, studies that combine graphene foams and metal oxide particles in order to enhance their performance in fuel cell applications or as catalysist, strated to attract more attention. In most of these studies, graphene foams that are obtained through the reduction of graphene oxide are doped with metal oxide via hydrothermal methods. However, due to the structural properties of the graphene foams used in these studies, doping process conducted is not thoroughly understood [3].

In this study, iron oxide nanoparticles are doped via hydrothermal methods into graphene foams which are obtained through CVD application on nickel substrates. Structural characterization of the resulting materials are assessed through SEM, XRD and Raman analyzes, while their magnetic properties are obtained via VSM analysis.

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References

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[3] Ke, Q. , Wang, J. Journal of Materiomics, 2016,37-54.

Figures

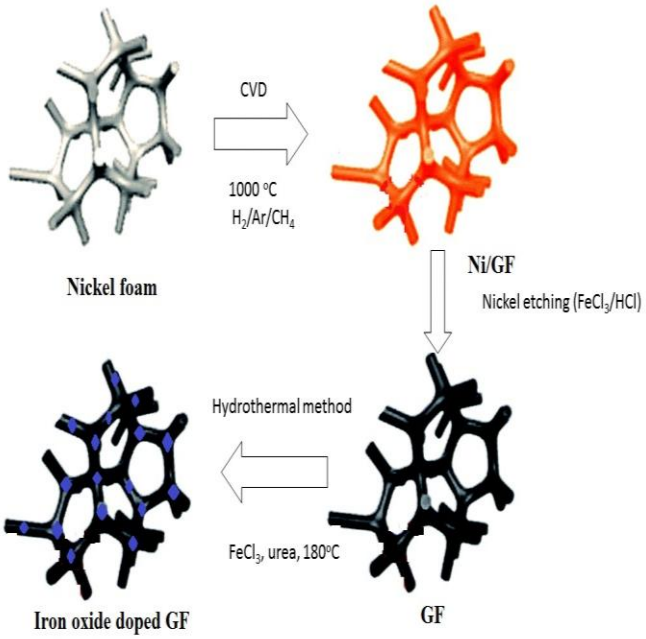

Figure 1: Schematic illustration of synthesis of iron oxide doped graphene foam