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Preparation of flower-like CoFe_2O_4 @graphene composites and their microwave absorbing properties

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ABSTRACT: Novel flower-like CoFe_2O_4 @graphene composites were prepared using a spray drying technique in combination with a solvothermal method, followed by calcination. Hundreds of uniform CoFe_2O_4 microspheres are encapsulated with gauzy graphene to form large flower-like composites. This unique structure effectively reduces agglomeration of graphene and enhances microwave absorption performances. The minimum reflection loss of as-obtained flower-like CoFe_2O_4 @graphene composites reaches -42 dB at 12.9 GHz with a thickness of 2 mm, and the effective absorption frequency ($\text{RL} < -10$ dB) is 4.59 GHz from 11.2 to 15.79 GHz. Flower-like CoFe_2O_4 @graphene composites show better microwave absorbing performance than pure CoFe_2O_4 microspheres. These CoFe_2O_4 @graphene composites are promising as light weight, broad frequency bandwidth and strong absorption microwave absorbers.

Keywords: Composite materials, Structural, Graphene, Cobalt ferrite, Spray drying, Absorbing performance

1. Introduction

With the rapid development of electronic technology, more attention has been paid to microwave absorbing materials for preventing the electromagnetic radiation pollution. It is urgently necessary to develop microwave absorbing materials with powerful absorption, thin thickness, low density and wide frequency bandwidth due to the increasing demands of information safety and human health [1].

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