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The microwave absorption properties of carbon-encapsulated nickel nanoparticles/silicone resin flexible absorbing material

Yingxin Huang[a], Haiyan Zhang[a,b,*], Guoxun Zeng[a], Zhenghui Li[a], Danfeng Zhang[a], Haiping Zhu[a], Runfeng Xie[a], Liming Zheng[a], Jionghang Zhu[a]

[a] School of Material and Energy, Guangdong University of Technology, Guangzhou 510006, Guangdong, PR China

[b] Guangdong Provincial Key Laboratory of Functional Soft Condensed Matter, Guangzhou 510006, PR China

ABSTRACT

Carbon-encapsulated nickel nanoparticles (Ni@C) with soft magnetic nickel nanoparticle core and dielectric carbon shell were synthesized by a modified arc-discharge method. The calculated reflection loss (RL) of Ni@C/paraffin composites and the measured RL of Ni@C/silicone coatings were studied at thicknesses of 1-3 mm and Ni@C contents of 40-60 wt.%. Ni@C nanoparticles show good microwave absorption properties in 2-18 GHz. The minimum calculated RL is -39.82 dB with 60 wt.% Ni@C at 3 mm, and the calculated RL < -10 dB can be obtained in the frequency of 5-13.41 GHz. Meanwhile, the minimum measured RL reaches -20.54 dB with 60 wt.% Ni@C loading at 2.5 mm and the widest bandwidth

*Corresponding author. Tel/Fax: +86-20-39322570

E-mail address: hyzhang@gdut.edu.cn