Electronic Supplementary Material (ESI) for RSC Advances

Iron Core Carbon Shell Nanoparticles Reinforced Electrically Conductive Magnetic Epoxy Resin Nanocomposites with Reduced Flammability

Xi Zhang,[1,2] Ouassima Alloul,[1] Jiahua Zhu,[1] Qingliang He,[1] Zhiping Luo,[3] Henry A. Colorado,[4] Neel Haldolaarachchige,[5] David P. Young,[5] T. D. Shen,[6] Suying Wei[2*] and Zhanhu Guo[1*]

[1]Integrated Composites Laboratory (ICL), Dan F Smith Department of Chemical Engineering
Lamar University, Beaumont, TX 77710 USA

[2]Department of Chemistry and Biochemistry, Lamar University, Beaumont, TX 77710

USA

[3]Department of Chemistry and Physics and Southeastern North Carolina Regional Microanalytical and Imaging Consortium, Fayetteville State University, Fayetteville, NC 28301 USA
[4] Department of Mechanical and Aerospace Engineering, University of California Los Angeles, Los Angeles, CA 90095 USA

[5]Department of Physics and Astronomy,
Louisiana State University, Baton Rouge, LA 70803 USA

[6]Nanostructured & Amorphous Materials, Inc. Houston, TX 77084 USA

Corresponding author: zhanhu.guo@lamar.edu Phone: (409) 880-7654 (Z. G.)
suying.wei@lamar.edu; Phone: (409) 880 7976 (S. W.)

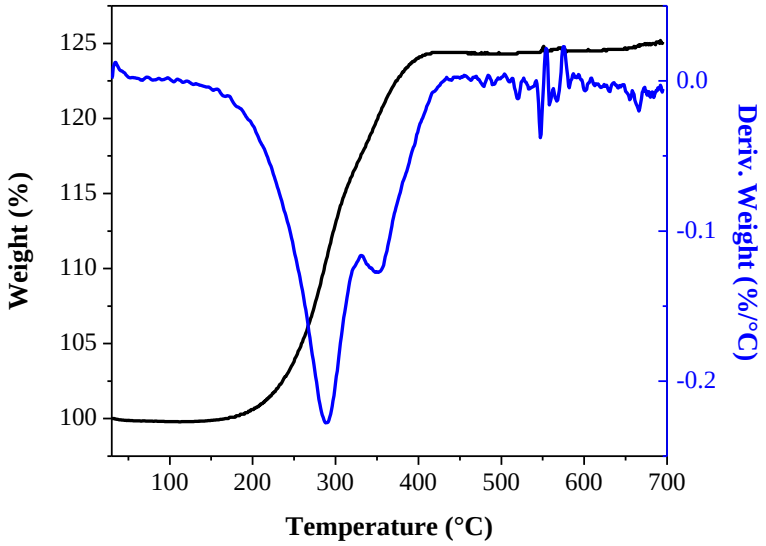

Fig. S1 TGA and DTG curve of the pure Fe@C nanoparticles.

The weight increase of the Fe@C nanoparticles in the high temperature range (above 200 °C) was associated with the decomposition of the carbon shell and the oxidation of the iron core of the nanoparticles. However, no obvious weight increase was observed in the PNCs, indicating that the epoxy matrix well protected the Fe@C nanoparticles even at high temperature range.

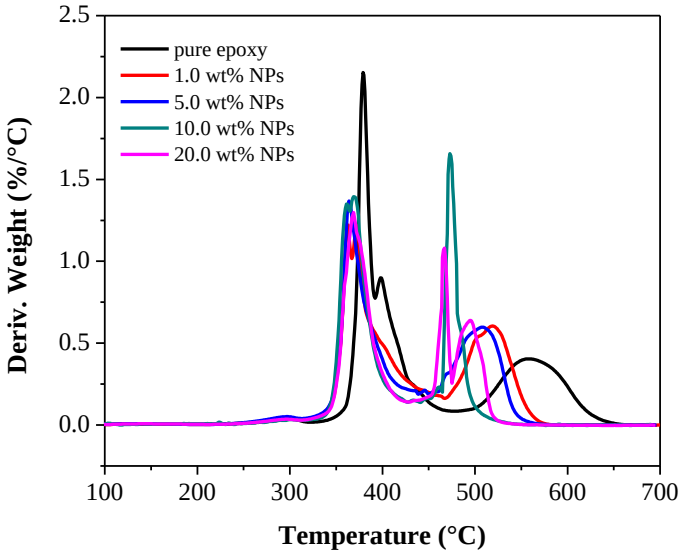

Figure S2 DTG curve of pure epoxy and its PNCs.

The DTG results correspond to the results of TG, the degradation took place in two stages. In addition, the temperature value of the second peak was observed to decrease with increasing the nanoparticle loading in the PNCs.