Economical Synthesis of FeNi alloy nanoparticles evenly dispersed two-dimensional reduced graphene oxide composites as thin and effective electromagnetic wave absorbers

Juan Li[a], Dong Zhang[b], Hui Qi[c], Guangming Wang[a], Jimin Tang[a], Ge Tian[a], Anhua Liu[a,d], Huijuan Yue*[a,d]， Yang Yu[e] and Shouhua Feng[a]

[a]State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, College of Chemistry, Jilin University, Changchun 130012, China.

[b]Key Laboratory of Physics and Technology for Advanced Batteries (Ministry of Education), College of Physics, Jilin University, Changchun 130012, China.

[c]The Second Hospital of Jilin University, Changchun 130041, P.R. China.

[d]Key Laboratory of High Performance Ceramic Fibers of Ministry of Education, College of Materials, Xiamen University, Xiamen 361005, China.

[e]State Key Laboratory of Rare Earth Resource Utilization, Changchun Institute of Applied Chemistry, Chinese Academy of Science, Changchun, China

Corresponding author: huijuan@jlu.edu.cn (Huijuan Yue)

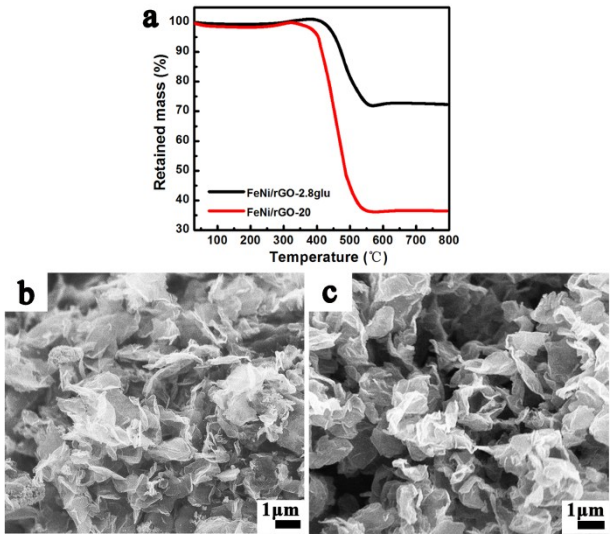

Fig. S1 TG curves (a) of FeNi/rGO-2.8glu and FeNi/rGO-20 composites; SEM images of FeNi/rGO-2.8glu (b) and FeNi/rGO-20 (c) composites.

The FeNi/rGO-2.8glu and FeNi/rGO-20 composites are synthesized via the same experimental procedures except for the different dosages of glucose (2.8 mmol for FeNi/rGO-2.8glu, 7.6 mmol for FeNi/rGO-20). From Fig. S1a, it can be obviously noted that FeNi/rGO-2.8glu and FeNi/rGO-20 composites display remaining weight of 72.34% and 36.46%, respectively. The mass percentage of carbon-based materials can be accordingly calculated as 44.80 % and 72.18%, respectively. The amount of carbon increases correspondingly as more glucose is added in the reaction. This indicates that the carbon formed by glucose is present in the product. Additionally, Fig. S1(b-c) both show purely two-dimensional structure for FeNi/rGO-2.8glu and FeNi/rGO-20 composites with no other morphologies. Again, it can manifest that glucose is carbonized into the amorphous carbon depositing on the surface of graphene.

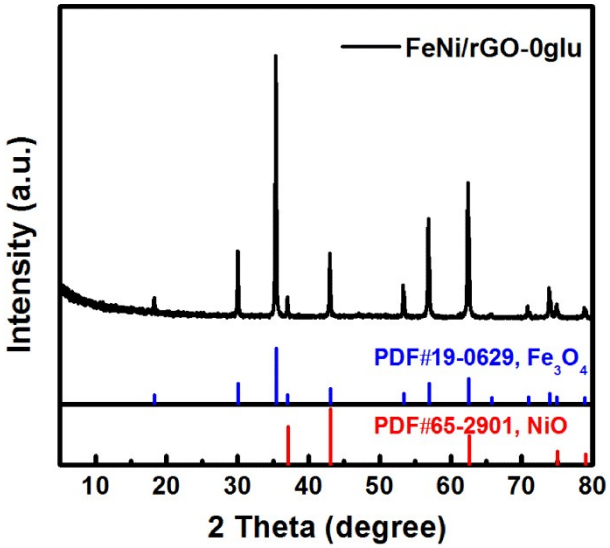

Fig. S2 XRD pattern of FeNi/rGO-0glu composite without glucose.

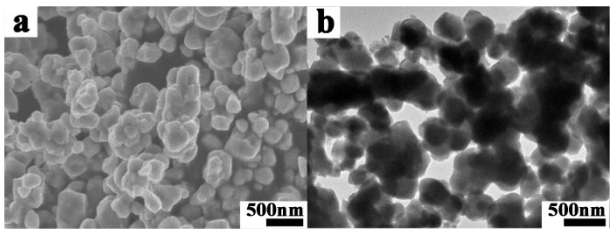

Fig. S3 SEM (a) and TEM (b) images of FeNi/rGO-0glu composite without glucose.

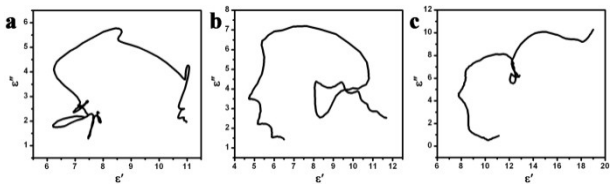

Fig. S4 Typical Cole-Cole semicircles (ε' versus ε'') for FeNi/rGO-20 (a), FeNi/rGO-60 (b) and FeNi/rGO-100 (c).