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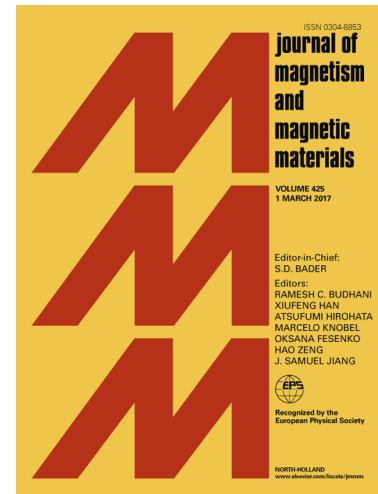
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**Superior corrosion-resistant 3D porous magnetic graphene
foam-ferrite nanocomposite with tunable electromagnetic wave
absorption properties**

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Abstract

Superior corrosion-resistant magnetic graphene foams decorated by Fe₃O₄ (MGF@Fe₃O₄) have been constructed through *in-situ* simultaneous deposition of ferrous ion (Fe²⁺) induced graphene oxide (GO). Their chemical composition, micro structure and properties were investigated in detail by Raman spectroscopy, X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), vibrating sample magnetometer (VSM) and vector network analyzer. These 3D porous MGF@Fe₃O₄ exhibit much better electromagnetic wave (EMW) absorption properties and corrosion resistance than 2D hybrid materials of magnetic metal particles and graphene sheets. The tunable EMW absorption performance can be easily implemented by tailoring their micro structure. Their minimum reflection loss (RL_{\min}) value reaches -64.4 dB at 10.8 GHz and maximum effective absorption bandwidth (EAB) is up to 6.0 GHz from 12 GHz to 18 GHz with a matching thickness of 2.4 mm. After treatment in hydrochloric acid for 70 days, the acid-treated MGF@Fe₃O₄ still keeps excellent EMW absorption performance with their decrease of saturation magnetization lower

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