

# Accepted Manuscript

Three-phase PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs heterostructure: Fabrication, characterization and investigation of microwave absorption and EMI shielding of PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs/epoxy hybrid composite

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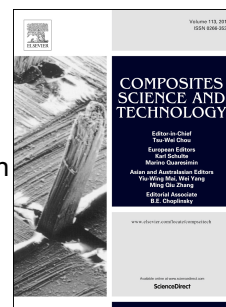
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# **Three-phase PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs heterostructure: fabrication, characterization and investigation of microwave absorption and EMI shielding of PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs/epoxy hybrid composite**

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## **Abstract**

In this work, a three phase carbon fiber (CF)-based electromagnetic (EM) wave absorbing and EM interference (EMI) shielding heterostructure was fabricated through a layer by layer assembly. The nano-Fe<sub>3</sub>O<sub>4</sub> particles were deposited on CFs via a modified multi-step electrophoretic deposition (EPD). The PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs heterostructures were prepared using an in situ polymerization process of polyaniline (PANI) on nano-Fe<sub>3</sub>O<sub>4</sub>@CFs in HCl solution. The results showed that the PANI@nano-Fe<sub>3</sub>O<sub>4</sub>@CFs mats with a layer by layer (LBL) assembly were successfully fabricated. The saturated magnetization (Ms) of the as-synthesized nano-Fe<sub>3</sub>O<sub>4</sub> powder decreased from 72.612 emu/g to 8.934 emu/g for the nano-Fe<sub>3</sub>O<sub>4</sub>@CFs and

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