

Twinning for graphene-based composites in EMI shielding

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In the era of intensive development of microelectronics, energy, and car industries along with Radio-Frequency (RF) telecommunications, the pollution caused by Electromagnetic Waves (EWs) is ever-present. EW interferences (Electromagnetic Interference - EMI) exhibit perturbation and negative impact on devices and systems including those used in everyday life as well as on the specialized, sensitive, and sophisticated instruments used in research laboratories. EMI could cause untrusted signals and RF noise. To prevent these issues, materials able to block or absorb the radiated EWs are urgently required. The GrInShield project is focused on developing new graphene-based shielding nanomaterials and increasing researchers' expertise in EMI shielding measuring, protective materials, and possibilities to bring these new products to the market.

INTRODUCTION: The GrInShield project uses graphene oxide (GO) obtained by Hummers' reaction and electrochemical exfoliation of graphite [1,2]. We have analysed the factors that affect the shielding efficiency of materials [3] and studied the reaction conditions that lead to obtaining graphene with different sizes and oxygen content [4].

RESULTS AND DISCUSSION: The GrInShield project aims to produce composites of GO with silver nanowires (AgNWs) to develop GO-AgNW composites for EMI shielding applications. To achieve these goals, the project gathers experts from the chemistry of nanomaterials, and polymer processing, along with specialists for near-field microscopy tools and radiofrequency (RF) characterization of materials.

CONCLUSIONS: The GrInShield project is developing new nanomaterials for EMI shielding based on carbon nanomaterials, metallic nanomaterials, and polymers. The fabrication of low-cost, sustainable, eco-friendly, durable EMI shielding material should be achieved.

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