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(Commentary)

Shape Memory Graphene Nano-composites Essentials, Properties, and Importance

Ayesha Kaushar*

Department of Nanomaterials, NorthWestern University, China

**Correspondence: Ayesha Kaushar, Department of Nanomaterials, NorthWestern University, China, E-mail: ayeskau@12.ch*

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INTRODUCTION: Shape memory nano-composites are excellent because they can switch between variable short and unique shapes when opened to external enhancements such as intensity, light, power, attractive fields, humidity, synthetic compounds, and pH Smart material. Shape memory polymers such as carbon nanotubes, graphene, nanodiamonds and carbon nanofibers contain various nanofillers. Among nanocarbons, graphene has attracted research interest for the advancement of polymer or graphene nanocomposites with shape memory. Graphene is a remarkable one-molecule-thick bilayer nanofoil of sp2-hybridized carbon particles. Graphene has been used as a powerful nanofiller in polymer shape-memory nanocomposites due to its remarkable electrical conductivity, compatibility, strength and strength. Both thermoplastic and thermoset networks have been used to construct shape memory nanomaterials with graphene nanofillers.

DESCRIPTION: In the shape memory polymer or graphene nanocomposites, the shape was fixed by temperature change and changed to the initial shape by external reinforcement. Considering nanocomposite graphene allows rapid exchange from transient to proprietary forms. Fine graphene scattering, lattice nanofiller interconnections, and improved practical interaction points lead to shape memory graphene-derived nanocomposites with excellent performance. Fabrication, actual properties and shape memory stimulation of polymer or graphene nanocomposites have been investigated. Responsive polymer or graphene nanocomposites generally facilitate effects induced by heat, electric current, and light. Incorporating graphene improved the physical/covalent bonding, shape recovery, shape retention, conformability and crystallization effect of the polymer. It is also expected to be applied to fields such as aerospace, automobiles, structural design, and biomaterials. Shape memory materials are recognized as a unique class of sophisticated materials. In the 1980s, this class of glorious materials, namely H. shape memory materials, was transformed (from a twisted shape) to it turns out that it has the ability to recover its inherent shape. The shape memory effect is the ability of a material to regain its unique structure upon external modification. Shape memory materials that respond to an intensity boost, called thermally responsive materials, were the first to receive research attention. This can be judged by the ease of handling and application.

Shape recovery of the material using electric fields, light, humidity, and various enhancements was then explored. Various polymers, including polyurethanes, epoxies, polyesters, and various thermoplastics and thermosets, have been shown to influence shape memory. The most common focus on shape memory materials includes thermally activated, electrically actuated, and photoresponsive materials. Fragmented polymers with different blocks in the backbone show good shape memory effects. The improved reactive properties of polymers are enhanced by the integration of carbon nanoparticles such as carbon nanotubes, graphene and carbon black. Plans, highlights and uses of shape memory polymers and nanocomposites were explored. Systems of shape memory materials and their excitation effects were also studied.

Graphene is a new bilayer nanocarbon nanostructure composed of sp2-hybridized carbon particles. Graphene possesses a vast surface area and unique properties that make it suitable for the design of well-designed shape-memory composites and polymeric nanomaterials. For

example, graphene only modestly improved the shape memory of metal compounds (such as copper amalgam). Graphene is remembered as a metal composite with improved shape recovery, superelasticity, flexibility, and strength properties. For polymer nanocomposites, considering graphene, whimsical shapes can be rapidly exchanged into unique shapes.

CONCLUSION: Thus, graphene scattering collaboration of lattice nanofillers and practical placement of connection points have improved the superior design of responsive graphene nanocomposites. Furthermore, we investigated the fabrication, properties and activation strategies of shape-memory graphene nano-composites.

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