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**EDITORIAL**

# Editorial on Emerging Trends in Polymeric Materials Research and Applications

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Polymeric materials especially nanocomposites (Graphene, MXene based) are widely used in food, electronics, biomedical, batteries, energy storage, fuel cells, wastewater treatment, and automotive [1]. Nanocomposites are stronger, lighter, and stiffer and can improve properties such as mechanical strength, electrical conductivity, thermal stability, flame retardancy, surface appearance, optical clarity and chemical resistance. Current research is focusing on nanocomposites applications [1-3], $CO_2$ capturing polymers [4], making polymers degradable [5-7] especially developing bio-composites [8] and green composites [9,10] which are degradable, use of deep eutectic solvents for biomass pretreatment to manufacture bio-composites or green composites and polymeric composites as drilling fluids [11] and their use in developing ceramics and to construct sequence-controlled and complex topological structures through control of polymerization methodologies.

Current research is progressing towards tailoring the properties of nanocomposites thus enabling their use for multiple applications. Entropic effects interplay with interparticle interactions can yield effective tailoring of nanocomposites [12]. The relation between thermodynamic interactions and macroscale morphologies is important. Schiff base with nitro groups [13], dibutyltin (IV) complex, telmisartan organotin (IV) [14] and polyphosphates [15] are currently employed for carbon dioxide storage. Rice husk treated with choline chloride and aqueous glycerol was incorporated into LDPE to develop bio composites with high hardness and elastic modulus and lower creep rate [16,17]. Deep eutectic solvents result

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in polymer bio-composites with enhanced mechanical and fire safety characteristics [18] and their use is increasing in developing carbon composites [19], silica composites [20] and valorization of lignocellulosic biomass [21].

Polymer composites have many applications in the oil and gas sector where it is used as an additive in the preparation of smart fluids. The smart fluids in the oil and gas sector are used as drilling aids in the drilling process of wellbore and enhanced oil recovery process. Polymer composites prepared by a combination of water-soluble polymer and carbon nanotubes will improve the rheology, filtration, and shale inhibition properties of drilling fluids. Polymer nanocomposite synthesized by solution polymerization technique in which functionalize carbon nanotubes were dispersed in the solution and three different monomers (2-Acrylamido-2-methylpropane sulfonic acid, acrylamide, and maleic acid) reacted with each other to produce polymer nanocomposite is utilized as an additive for drilling fluid formulation. The synthesized polymer nanocomposite improved the thermal stability, rheological properties, filtration properties, and shale inhibition properties [11,22].

## Conflict of Interest

There is no conflict of interest.

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