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Editorial
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Polymers and its Modifications

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Polymers are inseparable part of our life and composites are the wonder materials. In the recent years, polymer and clay nanocomposites have attracted much attention as advanced polymeric materials in academia as well as in industry. Significant improvements in mechanical and physical properties of the resultant polymeric nanocomposites are recorded with respect to the pristine clay and the polymer matrix with low clay loading content. These hybrid materials can combine the properties of both inorganic and organic components, such as swelling, water uptake, mechanical characteristics, thermal behavior, biocompatibility and biodegradability. Polymer and clay nanocomposites can be prepared by three methods namely, solution exfoliation, melt intercalation and in situ polymerization. In situ polymerization is one of the most common techniques of achieving a highly efficient dispersion of layered silicate in a polymer. One particular method of in situ polymerization that are used to obtain well defined grafted polymer onto clay surface is controlled radical polymerization techniques. Graft copolymerization is an efficient means to incorporate the desired properties into substrate without drastically affecting the inherent traits. It imparts additional features such as thermal and chemical resistance to the naturally existing back-bone for various applications. Grafting of polymers onto clay is done either by grafting on or grafting from techniques. However, the later technique is much desirable and more effective because it produces high densities of the grafting polymer. Several methods are used to graft polymer from the substrate. However, the most easy and successful one in producing well defined polymer with controlled polydispersities and predetermined molecular weight is the surface-initiated atom transfer radical polymerization technique (SI-ATRP). This approach allows the synthesis of uniform polymer layers of high grafting density, with tunable thicknesses via molecular weight control on surface. Recently, surface-initiated atom transfer radical polymerization (SI-ATRP) has been demonstrated as a useful tool for modification of different substrates such as silica, montmorillonite clay (MMT), gold surface, polymer films, silicon wafers, metal and metal oxide, paper or glass, latexes and carbon nanotubes (CNTs) affording various polymer brushes with desired structures, properties, morphologies and functions with high applicable values. Glycopolymers are polymers with pendant saccharide residues which are characterized by their high hydrophilicity and water solubility so they can be used for specialized applications, such as artificial materials for a number of biological, pharmaceutical and biomedical uses. Recently, glycopolymers have attracted much attention as a model system to study the specific molecular recognition functions of carbohydrate and their possible applications in biomedical materials and biosensors after the immobilization. Consequently, due to their importance as biomaterials led to the preparation of glycopolymers, MMT nanocomposites via SI-ATRP for several future applications. Many trials were exerted to prepare low polydespersity glycopolymer brushes using different substrates and many fruitful results were obtained. I hope upcoming generation could further elaborate the field and bring forth better scientific applications.

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