PREFACE

Modern era of polymer research presents challenges to develop unique materials with environment friendly attributes. Since inception, polymer has gained unique position in the domain of material science. The versatile applications render polymer as an essential material in day to day life. However, the global concerns on environmental issues have raised serious nuisances over the innocuous use of polymeric materials. In most of the time, polymeric materials have been designed with limited consideration to their ecological footprint, especially issues related to purely petroleum based synthesis, high volatile organic compound (VOC) content and their ultimate disposability. Hence, the challenge before the material scientists is to address these basic glitches through the expansion of novel bio-based, biodegradable, eco-friendly polymeric materials, which also possess unique and smart properties.

Delving into the possible perspectives in this domain, tannic acid based waterborne hyperbranched polyurethane nanocomposites have been put forwarded as eco-friendly material with unique properties. Profound biodegradability, bio-based origin, biocompatibility and low VOC level supplement environment friendly attributes to such systems. On the other hand, from the performance perspective, these nanocomposites are fit for many modern applications, e.g. polyurethane/carbon dot nanocomposite for biomedical, opto-electronic and catalytic applications, polyurethane/hydroxyapatite nanocomposite for biomedical application and polyurethane/nickel ferrite-reduced graphene oxide based nanocomposite for smart applications like stimuli responsive shape memory behaviour. Thus, the work may open fresh avenue to develop eco-friendly, bio-based waterborne hyperbranched polyurethane nanocomposites with unique properties, which could be used in modern day applications.

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