PREFACE

In the pursuit of fulfilling the rising demands of polymer industry and material science, polyurethane nanocomposites are researched to unveil their broad dimension of applications. Amongst them, fabrication of polyurethane nanocomposite with various carbon-based nanomaterials has garnered extensive interest owing to their remarkable attributes. In recent times, "going green" has grown to be the steering principle for research, globally in order to address ecological concerns associated to utilization of petroleum based resources and waste management. It is indeed a challenge to develop industrially significant eco-friendly polyurethane nanocomposites using cost-effective, abundant, bio-based renewable resources like starch, which also possesses smart and unique attributes. Nevertheless, exploration of starch modified hyperbranched polyurethane nanocomposites using carbon-based nanomaterial to determine their suitability for different advanced applications is rare in literature and yet to be done comprehensively. Thus, investigating into the potential perception in this field, biocompatible, biodegradable starch modified hyperbranched polyurethane nanocomposites were developed. Such nanocomposites are suitable for different advanced applications, for instance, polyurethane/carbon dot-silver nanocomposite and polyurethane/reduced carbon dot nanocomposite for smart biomedical application, polyurethane/reduced carbon dot-zinc oxide nanocomposite for photocatalytic applications and polyurethane/reduced graphene oxide-silver-reduced carbon dot nanocomposite for photocatalytic, self-healing and self-cleaning applications.

Therefore, the work reveals a new avenue to develop eco-friendly, smart, high performing, starch modified hyperbranched polyurethane nanocomposites with unique properties, and reflects the immense potential for different modern applications.

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