

Immobilization of heteroatom-doped carbon dots onto nonpolar plastics for antioxidant and food monitoring applications

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Abstract

Nitrogen, phosphorous, and sulfur doped carbon dots were prepared by the hydrothermal method. These C-dots showed excellent photostability and optical properties and good biocompatibility and radical scavenging activity. Nitrogen, phosphorous, and sulfur co-doped carbon dots have been immobilized onto nonpolar plastic films polypropylene (PP) via the photochemical grafting strategy. Such photografting was accomplished using grafting of poly(acrylic acid) onto PP films. Carbon dots and acrylic acid dispersion was used as the grafting mixture for this purpose. Acrylic acid played a role in grafting, and the synthesized poly(acrylic acid) was physisorbed over the carbon dots nanoparticles. To the best of our knowledge, though a handful of works have been reported on polymer/ carbon dots

composites, no such reports mention composing PP with carbon dots, neither by photografting nor by any other method. The coated film unveiled good physical performance, transparency, and good antioxidant capacity, which can extend the shelf life of food. In this context, the present work has revealed the introduction of carbon dots onto PP films for the first time to fabricate a functionalized polymer film with antioxidant properties.

Biography

Poushali Das is currently working in Institute for Nanotechnology and Advanced Materials, Israel.