List of Publications

❖ Publications Related to Thesis

1. **B. Mistry**, C. N. Murthy, In the Journal of Macromolecular Science, Part A: Pure and Applied Chemistry, August 2022, "Synthesis of ABA type triblock copolymer from poly(dimethylsiloxane) macroinitiator: A novel attachable initiator for atom transfer radical polymerization". (Accepted-19th September 2022, IF: 2.216)

❖ Publication Not- related to Thesis

1. **B. Mistry**, H. K. Machhi, R. Vithalani, D. Patel, C. K. Modi, M. M. Lad, K. R. Surati, S. S. Soni, P. K. Jha and S. R. Kane, In the Journal of Sustainable Energy Fuels, 2019, DOI: 10.1039/C9SE00338J. "Harnessing the N-Dopant Ratio to Carbon Quantum Dots for Enhancing the Power Conversion Efficiency of Solar Cell". (IF: 5.503)
2. Sneha Soly, **Bhavita Mistry**, C. N. Murthy, In Polymer International, November 2021, entitled "Photo-mediated metal-free atom transfer radical polymerization: recent advances in organocatalysts and perfection towards polymer synthesis". DOI: 10.1002/pi.6336, (IF: 2.990)

❖ Book Chapter

1. N. S. Joshi, D. K. Pandey, **B. Mistry**, D. K. Singh, In the Springer Nature, Metal Oxide Nanoparticles: Synthesis, Properties, Characterization, and Applications.

Journal of Macromolecular Science, Part A >
Pure and Applied Chemistry
Volume 59, 2022 - Issue 12

Research Articles

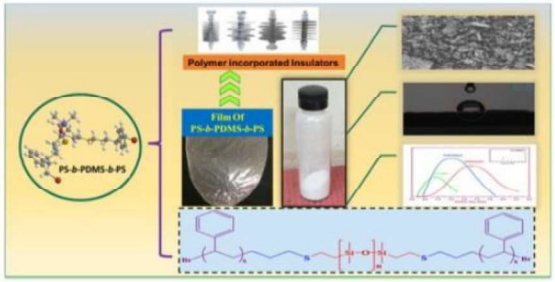
Synthesis and properties of ABA type triblock copolymer from poly(dimethylsiloxane) macroinitiator: Development of novel attachable initiators for atom transfer radical polymerization

Bhavita Mistry & C. N. Murthy

Pages 786-797 | Received 13 Jul 2022, Accepted 17 Sep 2022, Published online: 03 Oct 2022

Abstract

A sequence of ABA-type polystyrene-*b*-poly(dimethylsiloxane)-*b*-polystyrene (PS-*b*-PDMS-*b*-PS) triblock copolymers were synthesized by ATRP (Atom Transfer Radical Polymerization) after appropriate end functionalization of vinyl terminated PDMS. Vinyl terminated PDMS was reacted with a 3-chloropropane thiol to synthesize a halo terminated macroinitiator. Subsequently, this macroinitiator was used to synthesize ABA-type block copolymers. The resulting block copolymers were characterized to confirm the presence of PDMS & PS blocks. The theoretical molecular weight and GPC was used to verify the high molecular weight of the ultimate block copolymer. The results show that the PS chains were successfully bound to the PDMS backbone and molecular weight linearly increased with time during the controlled polymerization. The functionality of the given polymer was confirmed by FT-IR analysis, ^{1}H NMR, and ^{13}C NMR spectra. The thermal stability increased after the addition of PS with PDMS. Additionally, the EDS analysis confirms the halogen content. DLS verified the particle size, whereas SEM was used for the morphology of the nanoaggregates. This triblock has good moisture resistance & thermal stability as determined by thermogravimetric analysis. The formation of PDMS blocks increased the hydrophobicity of the PS and contact angle analysis confirmed this.



Keywords: Block copolymers | ATRP | Thiol-Michael addition reaction | PDMS-MI | characterizations (PS-b-PDMS-b-PS)

Issue 11, 2019

Previous Article Next Article

From the journal:
Sustainable Energy & Fuels

Harnessing the N-dopant ratio in carbon quantum dots for enhancing the power conversion efficiency of solar cells†

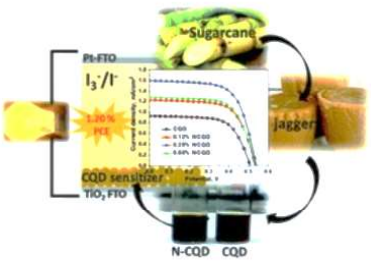
Check for updates

Bhavita Mistry ,‡[a] Hiren K. Machhi ,‡[b] Ravi S. Vithalani ,‡[a] Dikin S. Patel ,‡[a] Chetan K. Modi ,*[a] Meha Prajapati ,[b] Kiran R. Surati ,[b] Saurabh S. Soni ,*[b] Prafulla K. Jha[c] and Sanjeev R. Kane[d]

Author affiliations

Abstract

Nowadays, green materials are being prepared to a greater extent to conserve the environment. Due to their outstanding properties, carbon quantum dots (CQDs) are becoming the alternatives of the conventional semiconductor-based quantum dots and organic dyes. We reported the one-step synthesis of CQDs and nitrogen-doped carbon quantum dots (NCQDs) by the solvothermal treatment of green and renewable non-centrifugal cane sugar. The successful syntheses of CQDs and NCQDs were substantiated by various physicochemical techniques such as Fourier-transform infrared spectroscopy (FTIR), Raman spectroscopy, transmission electron microscopy (TEM), and X-ray photoelectron spectroscopy (XPS). The photoluminescence quantum yields of CQDs and NCQDs were observed to be 5.2% and 9.8%, respectively. Due to their commendable photostability, these NCQDs with different loadings of nitrogen were applied as green sensitizers in TiO_2-based solar cells. These NCQDs achieved the highest power conversion efficiency of 1.20% under 0.1 sun illumination (AM 1.5). We believe that this competitiveness of the fabrication of CQDs from the cheapest and green source is the most promising and useful for light harvesting.



Polymer International / Volume 71, Issue 2 / p. 159-168

Review

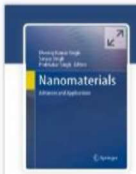
Photo-mediated metal-free atom transfer radical polymerization: recent advances in organocatalysts and perfection towards polymer synthesis

Sneha Soly, Bhavita Mistry, CN Murthy

First published: 23 November 2021
https://doi.org/10.1002/pi.6336

Abstract

Atom transfer radical polymerization (ATRP) is a significant improvement over traditional radical polymerization, which lacked control over molecular weight distribution and molecular weight. However, with the increasing advancement in synthetic polymer chemistry and the requirement of doing away with metal catalysts, which on one hand remain as contaminants even in trace quantities and on the other are environmentally unsustainable, catalysts that are totally organic in nature are being explored and success is being reported in the literature although in a very sparse way. This review is an attempt to give an overview of all the organic photocatalysts employed in metal-free ATRP reported from 2014. It covers the recent advancements in photoinduced metal-free ATRP and explains about the two possible mechanisms, i.e. oxidative and reductive quenching pathways, and the future direction in which this unique polymerization technique is heading. © 2021 Society of Industrial Chemistry.



Nanomaterials pp 103–144 | Cite as

Metal Oxide Nanoparticles: Synthesis, Properties, Characterization, and Applications

Nirav Joshi, Deepak K. Pandey, Bhavita G. Mistry & Dheeraj K. Singh ✉

Chapter | First Online: 14 January 2023

75 Accesses

Abstract

Metal oxide nanoparticles (MONPs) are a substantial category of nanomaterials that have numerous implications in science and technology owing to their distinctive characteristics such as high surface-to-volume ratio, large surface area, and abundance on earth. The present book chapter attempts to present a brief summary of research on MONPs, including available synthesis routes, techniques for characterization, and some of the unique nanoscale physicochemical features. Further, we provided an overview of the defining specific applications of MONPs in a variety of applied nanotechnology domains. We anticipate that this chapter will contribute to an increase in understanding and the recent developments in the utilizations of MONPs in specific industrial sectors.

Keywords

Metal oxide nanoparticles **Synthesis** **Characterization techniques** **Properties** **Wastewater treatment** **Solar cells** **Batteries**