

Accepted Manuscript

Surface-initiated atom transfer radical polymerization from graphene oxide: A way towards fine tuning of electric conductivity and electro-responsive capabilities

Miroslav Mrlik, Martin Cvek, Josef Osicka, Robert Moucka, Michal Sedlacik, Vladimir Pavlinek

PII: S0167-577X(17)31453-2
DOI: <https://doi.org/10.1016/j.matlet.2017.09.107>
Reference: MLBLUE 23221

To appear in: *Materials Letters*

Received Date: 1 August 2017
Revised Date: 2 September 2017
Accepted Date: 27 September 2017

Please cite this article as: M. Mrlik, M. Cvek, J. Osicka, R. Moucka, M. Sedlacik, V. Pavlinek, Surface-initiated atom transfer radical polymerization from graphene oxide: A way towards fine tuning of electric conductivity and electro-responsive capabilities, *Materials Letters* (2017), doi: <https://doi.org/10.1016/j.matlet.2017.09.107>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Surface-initiated atom transfer radical polymerization from graphene oxide: A way towards fine tuning of electric conductivity and electro-responsive capabilities

Miroslav Mrlik*, Martin Cvek, Josef Osicka, Robert Moucka, Michal Sedlacik, Vladimir Pavlinek

Centre of polymer systems, Tomas Bata University in Zlin, Trida T. Bati 5678, 760 01, Zlin, Czech Republic

*corresponding author: mrlk@cps.utb.cz

Abstract

Presence of the tertiary amine in the reaction mixture during surface-initiated atom transfer radical polymerization (SI-ATRP) possess dual functionality, reduction of the graphene oxide (GO) and proceed the poly(methyl methacrylate) (PMMA) chain growth simultaneously. In the certain ratio between the ligand and GO, the slight reduction of the GO can be achieved and thus fine tuning of the conductivity is possible. Such benefits were utilized in the development of the novel dispersed phase based on GO-PMMA hybrid particles and their silicone oil suspensions for which their electro-responsive capabilities were investigated. This approach provides system which is very effective at very low particles concentrations (10 wt. %) and serving the shear stresses from 5 to 95 Pa depending on the conductivity of particles and applied external electric field.

Keywords: graphene oxide, reduction, SI-ATRP, PMMA, electrorheology, dielectrics,

Introduction

Electrorheological (ER) suspensions belong to the group of smart materials, those changing their rheological properties upon external stimulus, in this case electric field [1-4]. They are two-phase systems consisting mostly of solid polarizable particles homogenously

Download English Version:

<https://daneshyari.com/en/article/5462523>

Download Persian Version:

<https://daneshyari.com/article/5462523>

[Daneshyari.com](https://daneshyari.com)