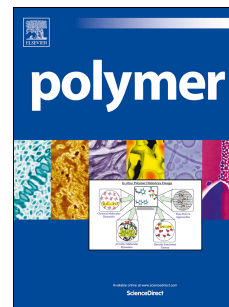


Accepted Manuscript

Synergistic effects of janus particles and triblock terpolymers on toughness of immiscible polymer blends

Ronak Bahrami, Tina I. Löblich, Holger Schmalz, Axel H.E. Müller, Volker Altstadt



PII: S0032-3861(16)31135-1

DOI: [10.1016/j.polymer.2016.12.044](https://doi.org/10.1016/j.polymer.2016.12.044)

Reference: JPOL 19280

To appear in: *Polymer*

Received Date: 24 September 2016

Revised Date: 13 December 2016

Accepted Date: 15 December 2016

Please cite this article as: Bahrami R, Löblich TI, Schmalz H, Müller AHE, Altstadt V, Synergistic effects of janus particles and triblock terpolymers on toughness of immiscible polymer blends, *Polymer* (2017), doi: 10.1016/j.polymer.2016.12.044.

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.

Synergistic Effects of Janus Particles and Triblock Terpolymers on Toughness of Immiscible Polymer Blends

Ronak Bahrami,^{1,‡} Tina I. Löbbling,^{2,3,‡} Holger Schmalz,^{2} Axel H. E. Müller,^{4*} Volker Altstadt^{1*}*

¹Faculty of Engineering Science and

²Macromolecular Chemistry II, University of Bayreuth, 95440 Bayreuth, Germany,

³Department of Applied Physics, Aalto University School of Science, FI-02100 Espoo, Finland.

⁴Institute of Organic Chemistry, Johannes Gutenberg University, 55099 Mainz, Germany

KEYWORDS: Polymer blends, Janus particles, compatibilization, micromechanics, fracture toughness

ABSTRACT. By influencing both the interfacial adhesion and the morphology, compatibilizers determine the mechanical properties of polymer blends. Here, we study the mechanical properties, in particular the fatigue crack propagation (FCP) of immiscible blends of poly(2,6-dimethyl-1,4-phenylene ether)/poly(styrene-*co*-acrylonitrile) (PPE/SAN), compatibilized with Janus nanoparticles (JPs) and polystyrene-*block*-polybutadiene-*block*-poly(methyl methacrylate) (SBM) linear triblock terpolymers. Synergistic effects of a mixture of both compatibilizers improve the FCP behavior and reveal the important role of interface stiffness and flexibility on the mechanical properties of polymer blends. The triblock terpolymer and JPs allow at the same time an elastic and stiff linkage at the blend interface and induce multiple deformation mechanisms such as crack bridging and matrix fibrillation that can dissipate energy and contribute to an improved FCP behavior. The presented concept allows tailoring macro-

Download English Version:

<https://daneshyari.com/en/article/5178554>

Download Persian Version:

<https://daneshyari.com/article/5178554>

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