Environmental Science An Indian Journal

Abstract

New approaches for polymer recycling

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Abstract:

Polymer recycling has become a critical issue of academic as well as industry discussions in the last years. One of critical issues is recycling of the car tires. There are at least 300 million tires on deposit in the United States and this amount is increasing continuously. In 1990, only 17 % of produced tires have been recycled. In the meantime it is possible to find the market for nearly 78 percent of used tires. However, the rest of used tires ends on registered or illegal deposits or land disposals. Furthermore, it is estimated that only less than 10% of waste rubber is reused into new product (physical recovery), i.e. the main part of collected rubber is used for thermal or chemical recovery. The main problem of physical recovery consists in rubber crosslinking i.e. it is not possible to process it again into new products. As the chemical devulcanization methods are very time consuming as well as expensive, there is a need to find an effective mechanical devulcanization technology in order to support physical recovery, which is industrially attractive. Physical recovery approach can be also combined with nanotechnology, which is one another topic with continuously growing industrial interest.Nanocomposites made of polymers and layered silicates (clays) by melt mixing are of great interest for both industrial and environmental points of view because of increasing effort to develop new tailored materials and also to recycle the growing volume of polymers especially in packaging field.

In this work, two examples of efficient polymer recycling using physical recovery for thermosetting as well as thermoplastic materials are presented: new approach for mechanical devulcanizationof care tires and for increasing the processability of PET waste.

Biography:

Prof. Dr. Milan Kracalik is associated professor at the Institute of Polymer Science, Johannes Kepler University Linz. His field of expertise covers in particular polymer rheology, polymer composites and nanocomposites, polymer recycling, study of structure-properties relationship in polymer materials and management associated with technological processes and products. He studied Technology &Management at the Brno University of Technology, Czech Republic, at Tomas Bata University in

Zlin and Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic associated with praxis in marketing department of Podravka-Lagris Inc., Czech Republic. After Ph.D. study he was post-doc researcher & project leader at the Department of Polymer Engineering and Science of the University of Leoben, Austria. Then he was research manager at the Department Research and Development of the ISOVOLTAIC AG, Austria. He has also lectured on Technology & Management at several European universities such as Albert Ludwigs University Freiburg, Budapest University of Technology and Economics, Chemical Research Centre / Hungarian Academy of Sciences, University of Zagreb and Department of Technical Sciences / Croatian Academy of Sciences and Art.

Recent Publications:

1. Milan Kracalik, Bio-Composites in 3D printing,2020
2. Milan Kracalik, Different approaches for calculation of cumulative storage factor as novel parameter for analysis of reinforcement in complex polymer nanocomposites,2019
3. Milan Kracalik, In Situ Monitoring of the Curing of a Bisphenol-A Epoxy Resin by Raman-Spectroscopy and Rheology,2019
4. Milan Kracalik, Micro- and Macrorheology of hydrogel-like biological materials,2018
5. Milan Kracalik, Microrheology of hydrogel-like biological materials,2018
6. Milan Kracalik, New approach for investigation of reinforcement in polymer nanocomposites using oscillatory shear flow data,2018

Citation: Milan Kracalik, New approaches for polymer recycling, Recycling 2020, May 04-05,2020; Vienne,Austria