

In full flow: Polymer mechanochemistry in processing

Niamh Willis-Fox

Department of Materials, University of Manchester, Oxford Road, M13 9PL, Manchester, UK

e-mail: niamh.fox@manchester.ac.uk

Abstract:

Many techniques for polymer processing have the potential to elongate and stretch polymer chains through the mechanical shear forces inherent within the technique. This talk will discuss how processing conditions can be varied to control the degradative outcome of polymer chain scission brought on by such stretching events. It will discuss the effect of including a mechanophore (mechano-responsive moiety) within the polymer backbone. Mechanophores enable a wide range of functional responses, including colour change, small molecule release, and generation of reactive functional groups, which can be exploited for applications in force sensors, drug delivery, and self-healing materials, respectively. Thus, understanding how polymer mechanochemistry can turn a component of processing from destructive to productive has many implications for sustainability in polymer processing.

Bio:

Niamh is a Lecturer in Polymer Science in the Department of Materials at the University of Manchester. She carried out her undergraduate and PhD studies in Chemistry at Trinity College Dublin, examining the effects of environment on the optoelectronic properties of conjugated polymers. During this time, she was awarded a Fulbright Award to work in the Department of Chemistry at Massachusetts Institute of Technology. Niamh held two postdoctoral positions in the Department of Engineering at the University of Cambridge. The first of these examined the effect of deposition techniques on the materials properties of polymers. The second focused on the materials challenges posed by the design and manufacturing of drug delivery devices developed to medicate hard-to-treat cancers. Niamh's work focuses on manipulating the properties of polymer materials, in particular how properties can be altered by varying processing conditions.

