



**UNIVERSITÀ
DI TRENTO**
Dipartimento di
Ingegneria Industriale

PhD

Course

Research in the field of polymer morphology: from joint replacements to local release of antibiotics and novel microscopic methods

November 17, 2022 - h. 15:00

Polo Ferrari 2, Via Sommarive 9, Trento - Seminar room

Speaker: Miroslav Slouf, Institute of Macromolecular Chemistry of the Czech Academy of Sciences

The research in the field of polymer morphology is connected mostly with the investigation of structure-properties relations and their application in development of functional polymer materials.

In the first part of this contribution, we will briefly describe three successful projects running in the Department of Polymer Morphology at the Institute of Macromolecular Chemistry in Prague, Czech Republic: (i) the modification of UHMWPE for total joint replacements with longer lifespan, (ii) the development of biodegradable, starch-based multicomponent polymer systems with local release of antibiotics, and (iii) the very recent development of quite new microscopic technique called 4D-STEM/PNBD, which can change arbitrary modern SEM microscope into a fast, user-friendly powder electron diffractometer.

In the second part of the contribution, the audience will vote, which of the three projects should be described in more detail. All three topics were presented in international polymer and/or microscopy conferences in the last two years. The UHMWPE project comprises Czech-Italian-Spanish collaboration, which is focused on building European database of explanted UHMWPE liners. At the moment the database contains >500 retrievals and starts to show interesting correlations between UHMWPE structure, properties, and reasons of joint replacement failures. The starch-based polymer systems for local release of antibiotics exhibit very promising combination of mechanical and bacteriostatic properties and, as a result, they might replace the traditional materials used in the field of orthopedic surgery, such as brittle and difficult-to-shape bone cements. The 4D-STEM/PNBD method (powder nanobeam diffraction in SEM microscopes equipped with modern pixelated detectors of transmitted electrons) represents one of the modern trends in the field of electron microscopy, which opens quite new possibilities for SEM users.

Info

Phone: +39 0461 282500

Email: dii.supportstaff@unitn.it

Local contact: luca.fambri@unitn.it

www.dii.unitn.it