Contribution ID: **34** Type: **Poster**

Novel Biaxial Deformation Stage for Natural Rubber for SAXS/WAXS

Thursday, 8 September 2022 19:35 (20 minutes)

Applications of natural rubber often involve biaxial deformation, yet most testing of rubber takes place using uniaxial deformation, despite the fact that, biaxial extension provides a more exacting test of theoretical models. In this work, we design and develop a novel equi-biaxial deformation stage which enables in-situ and time resolving small-angle X-Ray scattering and wide-angle X-ray scattering to be obtained during deformation. We use this system to study the strain induced crystallization of natural rubber in equi-biaxial mode, which takes place at uniaxial extensions typically greater than 4. The stage involves deforming a flat clamped circular disc of natural rubber about 1mm in thickness using compressed air into a hemispherical bubble, the pole of which exhibits equi-biaxial deformation. As this is a transmission device we are able to measure the absorption of the rubber sheet whilst it is being deformed to evaluate the thickness and hence the equi-biaxial extension ratio. We present preliminary results and describe the performance operation of the stage.

Would you like to participate in the Poster Prize competition?

Yes

Primary author: Mr SILVA, Daniel (Polytechnic of Leiria)

Co-authors: LAMOLINARA, Barbara (Polytechnic of Leiria); Prof. PASCOAL FARIA, Paula (Polytechnic of Leiria); Prof. MATEUS, Artur (Polytechnic of Leiria); Prof. MITCHELL, Geoffrey (CDRSP, Polytechnic of Leiria.); Mr GAMERIO, Fabio (Polytechnic of Leiria)

Presenter: Mr SILVA, Daniel (Polytechnic of Leiria)

Session Classification: List of posters presented during the conference