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***In-situ* Studies of Strain-induced Crystallisation of Poly (lactic acid) During Fast Uniaxial Deformation.** A Mahendrasingam^{*}, DJ Blundell^{*}, M Parton^{*}, W Fuller^{*}, T Narayanan⁺, ^{*}School of Physical and Geographical Sciences, Keele Univ., Keele, Staffordshire, ST5 5BG, UK, ⁺ESRF, Grenoble, France.

Recently, there is rapidly growing industrial interest in producing biodegradable polymers as alternatives to the conventional polymer materials produced from petrochemicals. Poly (lactic acid) (PLA) is attracting particular attention by industry because it can be derived from renewable natural resources such as corn starch and sugar cane.

Our recent studies shows that:

At temperatures less than 100°C, the onset of crystallisation is close to the point where the deformation has ceased. Subsequent crystallisation follows a first order kinetics. This behaviour is similar to that we have observed in our previous studies of PET during the very fast uniaxial deformation.

WAXS pattern recorded after annealing shows intermediate layer lines which is consistent with the α -form with a 10₇ helix. However, prior to annealing the separation of the layer lines indicates a different helical configuration.

In this paper further studies on the effect of draw temperatures, draw rates and small amounts of poly (D-lactide) on strain-induced crystallisation during the uniaxial deformation of PLA using in-situ time-resolved x-ray diffraction techniques at the ESRF will be discussed.