Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Study on hierarchical structure of polyethylene under uniaxial stretch by using USAXS, SAXS and WAXS SUMIAKI FUJII, Kyoto University, SHOTARO NISHITSUJI, Yamagata University, MIKIHITO TAKENAKA, HIROKAZU HASEGAWA, Kyoto University, KYOTO UNIVERSITY COLLABORATION, YAMAGATA UNIVERSITY COLLABORATION — In this study, we have investigated the structural changes of two kind of linear low density polyethylene (LLDPE) under uniaxial stretch in the order of submicron by using two-dimensional ultra small angle X-ray scattering (2D-USAXS) ,to nm scale small angle X-ray scattering (SAXS) and wide angle X-ray scattering (WAXS) Before stretch, the density fluctuations exist in the order of submicron scale. The circular-averaged scattering profiles of both samples exhibit the power-law behaviours of q as mass fractal properties. 2D-USAXS pattern of LLD-a, which has higher molecular weight than LLD-b after stretch is elongated perpendicular to the stretch direction. This change is caused by the elongation of the branch structures homogeneously. The pattern of LLD-b after stretch has been elongated parallel to stretch direction, and exhibit butterfly pattern It is known that the heterogeneous deformation associating with deformation causes this pattern. The difference in structural change between two samples originates from the difference in the molecular weight. However they show same tendency in SAXS and WAXS regions

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Date submitted: 19 Nov 2009 Electronic form version 1.4