

## **Deformation Process of Polymer Spherulite Observed with Microbeam-SAXS and -WAXS**

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In the field of polymer processing, the understanding of polymer deformation under force is very important for the design of polymer with higher performance. Especially, the deformation of polymer spherulite by drawing is the most interested phenomenon in film processes, and clarifying the deformation mechanism of spherulite will give the better direction of polymer design for films.

To observe the inhomogeneous deformation process within a spherulite, we applied the scanning microbeam-SAXS and -WAXS technique to a deformed large isotactic polypropylene(iPP) spherulite (averaged radius is around 200-300 $\mu$ m) by uni-axial hot drawing. By scanning various spherulites, the deformation degree of which is different, with microbeam, we found that the order of crystalline orientation in the up- and down-side area of a spherulite drawn in the horizontal direction came to lower and lamella stacking structure was broken in the initial stage of deformation and that the order of crystalline orientation and lamella structure recovered in the latter stage of deformation. On the other hand, the order of crystalline orientation and lamella stacking in the left- and right-side of a spherulite were kept in the initial stage and they were drastically changed in the latter stage of drawing.

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