



エラストマーの大変形における内部構造の解析

Analysis of internal structural changes in elastomers due to large deformation

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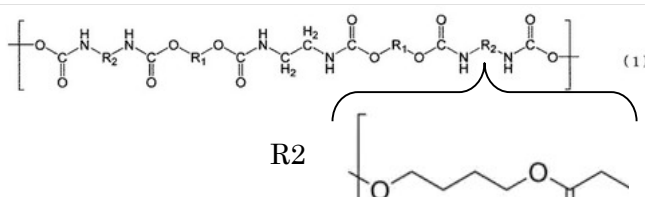
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2. Abstracts.

This study examined the relationship between the hard segment structure of segmented polyurethane (TPU) and its small-angle X-ray scattering (SAXS) patterns. The results showed that repeated stretching of TPU causes the SAXS pattern to become clover-shaped, indicating a stretching orientation of the hard segments.

3. Background and research objectives

Figure 1 shows the molecular structure of polyurethane elastomer (TPU). Permanent strain in TPU is mainly due to the crystallinity of the soft segment corresponding to R2. Therefore, reducing the crystallinity of the R2 portion is important. However, the structure of the hard segment, which includes isocyanate bonds, is also affected. This study used SAXS to investigate the effect of different R2-containing soft segments on the structure of the hard segments.

**4. Experimental**

The experiments were performed using simultaneous SAXS and wide-angle X-ray diffraction (WAXD) measurements, with a camera length of 1958.830 mm, a wavelength of 1.5 Å, and R-Axis. The samples used were BASF (with hardness values of 70 and 80).

5. Result and discussion

A method has been established for predicting the internal structure of polymer aggregates from SAXS patterns in polymer alloys. Segmented polyurethane (TPU) is composed of hard segment aggregates and soft segment aggregates. However, understanding the changes in SAXS patterns as TPU is stretched is not easy. Therefore, it is incorrect to discuss the permanent strain of TPU only in terms of the hard intersegmental distance (d) due to stretching. It is important to analyze the 2D SAXS patterns in more detail..

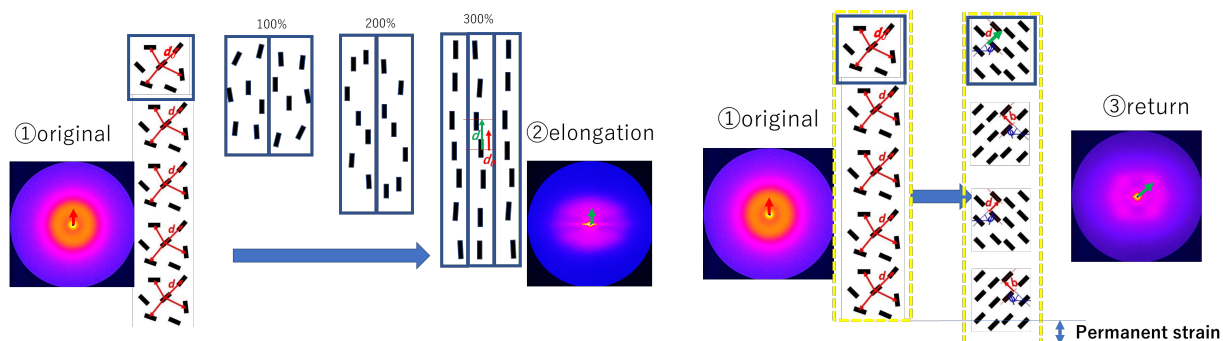


Fig.1 Fixation of orientation by stretching hard segments causing permanent strain in TPU

7. References

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