

An X-ray Pole figure Analysis on BOPE Films with Sequential Biaxial Drawing

Yujing Tang^{1*}, Jianjun Yin¹, Lizhi Liu¹, Bob B. He²

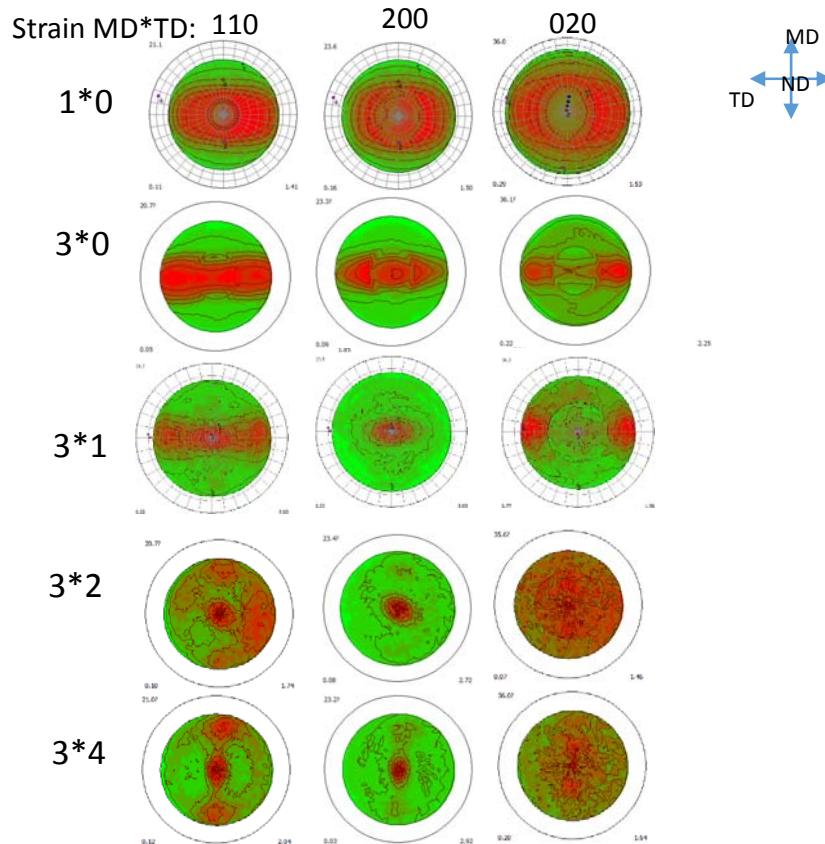
¹SINOPEC, Beijing Research Institute of Chemical Industry, Beijing 100013, China

²5465 East Cheryl Parkway, Madison, WI 53711, USA

*email: tangyj.bjhy@sinopec.com

X-ray diffraction is widely used for polymer characterization, such as phase identification, crystallinity, orientation et. al. In industry, it is a very important technology for evaluation of product performance through characterizing the microstructure.

In the present work, Biaxially Oriented Polyethylene (BOPE) films with sequential biaxial drawing prepared with a laboratory film stretcher KARO IV were studied by Pole Figure in order to understand the change of crystal orientation, structure at processing temperatures. The figure below shows the evolution of pole figure of the (110), (200) and (020) plane of PE film at different strain (first along machine direction and then along transverse direction under the constant MD strain). Figure shows that the a-axis of PE orthorhombic cell first change preferentially oriented along the TD-ND plane with increasing MD strain, and then change towards ND direction with increasing TD strain under the constant MD strain of 3. The result, together with other structure and property study in the present work are important for understanding the structure-property relationship of BOPE films.



Pole figures of the (110), (200), and (020) planes of the BOPE films during different drawing step.