

## Observation of Polypropylene Crystal Lamellae with SPM

### 1. Introduction

The lamellae form and alignment of a crystal polymer and morphology such as crystal size and distribution greatly affect a material's mechanical and other properties. Analysis of crystal lamellae structure with morphology observation has become important in designing and developing materials and products by analyzing the relationship between properties required in final product and morphology.

Here, we will introduce an observation example of polypropylene (PP) crystal lamellae with Scanning Probe Microscope (SPM).

### 2. Measurement Devices

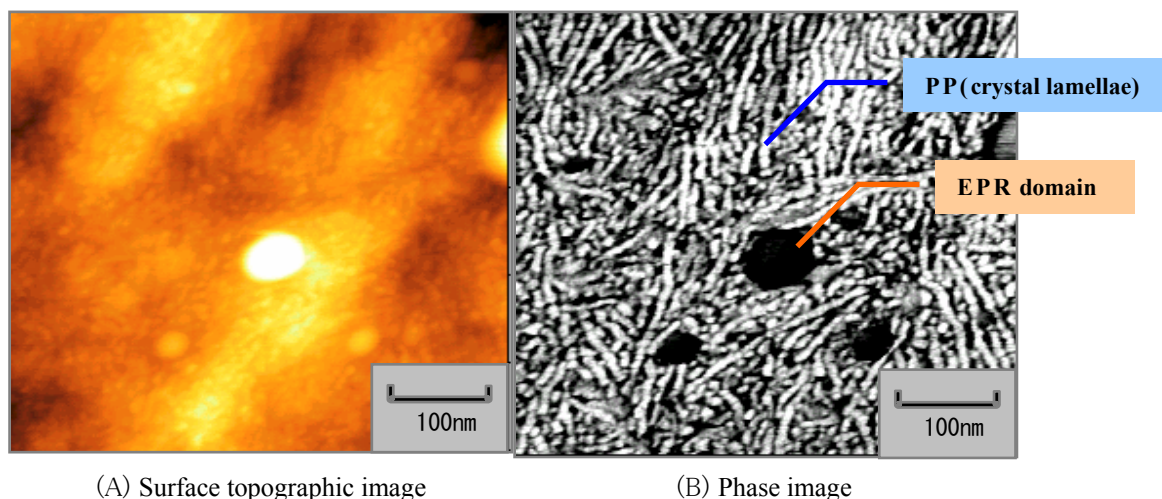
SPI3800N Probe Station and SPA-300HV Environment Control Unit were used for SPM, the measurement mode was phase mode and the scan area was 500nm × 500nm.

### 3. Measurement Results

Figure 1 shows the observation result of the PP block copolymer. PP block copolymer is an island-structure polymer alloy, which contains a continuous phase of matrix PP with dispersed phase of ethylene propylene rubber (EPR) domain. In Figure 1, in the surface structure image (A), we cannot verify the existence of the crystal lamellae, but in the phase image (B), we can clearly observe PP crystal lamellae, with approximately 10nm-thick crystals. At the same time, we can also observe the dispersion state (island structure) of EPR domains (dark areas in the phase image) dispersed in the matrix PP.

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(A) Surface topographic image

(B) Phase image

Figure 1 SPM observation result of PP block copolymer