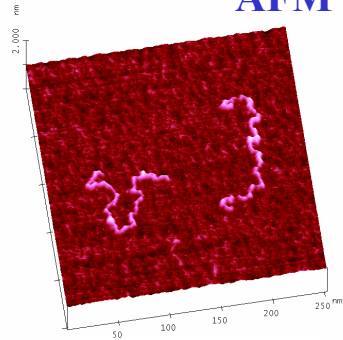


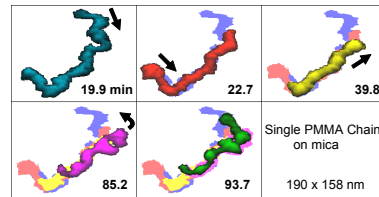
# High-Resolution Atomic Force Microscopy of Polymers

Professor Jiro Kumaki

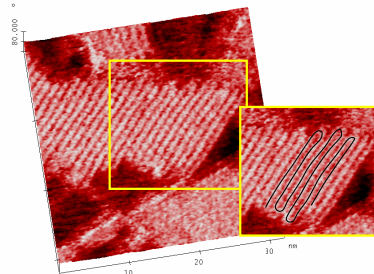
## AFM of Polymers



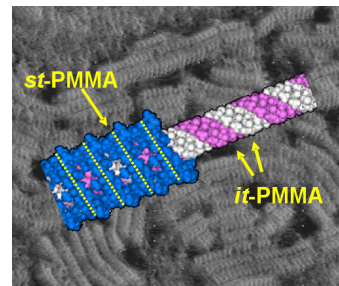
Single Polymer Chain



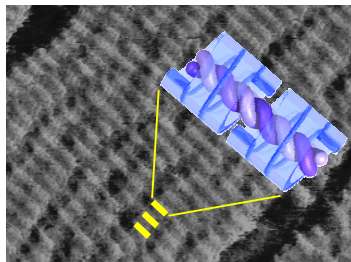
Movement of Polymer Chain



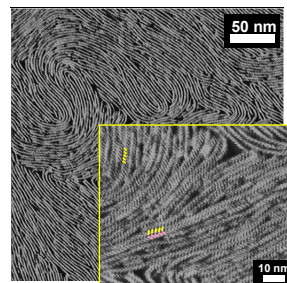
2D Folded Chain Crystal



Multi-stranded Helix



Molecular Weight Recognition



Amorphous LB Film

## Content:

Structure formations from single chains to amorphous solids and crystals are important issues of polymer science in order to understand the structure-property relationship of polymers. Atomic force microscopy (AFM) is a powerful tool to study materials in a molecular (or atomic) level, however it is still challenging to observe soft materials such as polymers in the high resolution. We demonstrated that AFM observations of polymers in a resolution close to or better than 1 nm were possible by using monolayers prepared by Langmuir-Blodgett (LB) technique or spin casting followed by annealing under solvent vapors. Our recent achievements include the observations of (1) “reptational-like” movements of single synthetic polymer chains on a substrate by in-situ AFM, (2) chain foldings and tie-chains of the two-dimensional (2D) folded-chain crystal in a LB film, and (3) the multiple-stranded supramolecular helical structure of the stereocomplex composed of isotactic and syndiotactic poly(methyl methacrylate)s, etc. We believe that the molecular level information is essential to improve our understanding of polymers and to build up nano-materials based on polymers.

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Research Interest : Polymer Physics, Ultrathin Films,

Atomic Force Microscopy

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