

Abstract Submitted  
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**Effect of Antifreeze Glycoprotein in contact with ice interface on the growth mechanism of an ice crystal** ETSURO YOKOYAMA, Computer Center, Gakushuin University, YOHSINORI FURUKAWA, ILTS, Hokkaido University — We study the effect of Antifreeze Glycoprotein in contact with ice interface on pattern formation of an ice crystal growing from AFGP solution. AFGP effects on ice crystal growth are completely opposite for basal and prismatic faces. Basal face of ice in pure water is governed by slow molecular rearrangements on the basal plane and is expressed as a second power of the supercooling at the interface. In the presence of AFGP molecules on the surface, the kinetic roughening transition from a smooth surface to a rough one occurs, and the growth rate is enhanced. Prismatic faces in pure water are controlled by transport of latent heat and are proportional to the supercooling at the interface. In the presence of AFGP molecules, the kinetic smoothing transition from a rough surface to smooth one occurs, and the growth rate is reduced. The effects relate to the anisotropic adsorption properties of AFGP molecules. In this study, we proposed a new model for the ice growth kinetics, in which a change of structure of water molecules near ice interface, i.e., hydrophobic interaction is taken into account instead of Gibbs-Thomson Effect caused by the pinning of a step by AFGP molecules.

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