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Growth-melt asymmetry in ice crystals at elevated pressure, above the roughening transition at 1600 bar, was recently reported and explained by Cahoon et al. [PRL, **96** (2006) 255502]. Here we report on a similar growth-melt asymmetry of ice at standard atmospheric pressure under the influence of spruce budworm antifreeze protein (sbwAFP). sbwAFP is a powerful antifreeze agent with high thermal hysteresis, which protects *Choristoneura fumiferana* (spruce budworm) from freezing in the harsh winters of the northern spruce and fir forests of the eastern United States and Canada. Antifreeze proteins have been found in many other species and have a wide range of applications in cryomedicine, cryopreservation, as well as frost protection of transgenic plants. However, the mechanism of action of antifreeze proteins remains an outstanding question. In this study, solutions containing low concentrations of sbwAFP were frozen and then melted back, giving rise to small individual crystals of hexagonal shape that were maintained during cooling within the thermal hysteresis gap. When the ice crystals were forced to grow by further cooling, the surfaces became stabilized at an angle close to 30° with respect to the original hexagonal planes that form in the melting process. To visualize the binding of sbwAFP to ice, we labeled it with enhanced green fluorescent protein (eGFP-sbwAFP). We found that eGFP-sbwAFP accumulated at the corners of a melting shape hexagonal ice crystal immediately after the melting process was stopped and covered the faces in the growing rotated hexagonal shape. The similarity of the growth-melt behavior of ice under the influence of sbwAFP to that of faceted ice under high pressure will be discussed.

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