Abstract Submitted for the MAR09 Meeting of The American Physical Society

Ice-binding protein investigation using microfluidic devices¹ YELIZ CELIK, NATALYA PERTAYA, Ohio University, Athens, OH, CHRISTO-PHERE P. GARNHAM, PETER L. DAVIES, Queens University, Kingston, ON, Canada, IDO BRASLAVSKY, Ohio University, Athens, OH — Ice-binding proteins (IBPs) inhibit ice crystal growth and recrystallization. We have developed a novel microfluidic device capable of precise local temperature control in order to grow single ice crystals. This device allows us to expose an ice crystal to an adjustable IBP concentration. We have used this device in conjunction with fluorescence microscopy to examine the affinities hyperactive IBPs have to specific ice planes in comparison with those of a moderately active fish IBP. We also demonstrate that hyperactive IBPs bind irreversibly to ice surfaces. The direct visualization of IBPs on ice using the microfluidic devices reveal the kinetics of attachment of these proteins to ice surfaces, as well as their concentration effects and facet preferences.

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