

Description of Additional Supplementary Files

Supplementary Movie 1: Freezing of $\Omega = 10$ mL bubbles in a walk-in freezer with a temperature of $T_{\infty} \approx T_w = -18.5$ °C and a relative humidity of $RH = 60 \pm 5\%$. It is observed that the Marangoni flow detached ice particles growing at the freeze front and carried them up the bubble.

Supplementary Movie 2: Freezing of bubbles deposited on a surface chilled to $T_w = -40 \pm 1$ °C. The first portion of the video depicts the partial freezing of a larger bubble, followed by the collapse of the unfrozen liquid dome, while the second portion of the video shows the complete freezing of a smaller bubble. Ambient conditions are a room temperature of $T_{\infty} = 23.6$ °C and a relative humidity of $RH = 65.2\%$.

Supplementary Movie 3: Freezing of $\Omega = 500$ μ L bubbles deposited on a Peltier stage cooled to a variety of surface temperatures. The critical height at which a freeze front comes to a halt is shown to increase with decreasing surface temperature. Ambient conditions are a room temperature of $T_{\infty} = 23.5 \pm 0.2\%$ and a relative humidity of $RH = 53.7 \pm 0.4\%$.