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Sidebranching in the Dendritic Crystal Growth of Ammonium Chloride ANDREW DOUGHERTY, FRANKLIN STINNER, Lafayette College — We report new measurements of the dendritic crystal growth of NH_4Cl from supersaturated aqueous solution. We report the first measurement of the capillary length d_0 to be approximately $2 \times 10^{-4} \mu$m. For growth at small dimensionless supersaturations Δ on the order of 0.005, we have estimated the stability constant σ^* to be approximately 0.008. The origin of the sidebranches in dendritic growth is not fully understood, but one model is that they result from the selective amplification of microscopic noise. We will compare measurements of the sidebranch envelope with predictions of the noise-induced sidebranching model of González-Cinca, Ramírez-Piscina, Casademunt, and Hernández-Machado [Phys Rev. E, 63, 051602 (2001)]. A second model is that sidebranches result from small oscillations of the tip. We have observed no such oscillations, but very small ones can not be ruled out. Given the finite experimental resolution, no measurement of the tip region can be completely free of contamination from early sidebranches. We will discuss this and other experimental challenges that need to be overcome before we can understand the origin of sidebranches.

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