

Abstract Submitted  
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**Classical nucleation theory explains the critical cooling rate of cryoprotectant solutions** MATT WARKENTIN, ROBERT THORNE, Cornell University — We have measured critical cooling rates for a range of concentrations of different solutes in aqueous solutions. Our results show that the glass formability of aqueous solutions is exponential in the concentration for all solutes tested, with a different characteristic concentration for each solute. This characteristic correlates with the Stokes radius of the solute. A simple modification of critical droplet theory relates the characteristic concentration to the critical nucleation radius in pure water, and explains the relationship between the Stokes radius and the exponential characteristic. This simple, general theory of glass formability in aqueous solutions is important at a fundamental level, and will also have broad consequences for the field of cryobiology.

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