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### **Nanocomposites with Crystalline Polymers**

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The creation of ordered (layered) biomimetic materials typically follows a series of steps: first mix nanoparticles with water, organize the NPs by ice templating, evaporate the ice and then back fill with metal or polymer. We propose a simple method exploiting the in situ self-assembly of a crystalline polymer in the presence of nanoparticles to facilitate this process, and provide a completely new pathway for the synthesis of biomimetic materials. A suite of complementary experimental tools are used in this analysis. In parallel, we are developing theoretical tools to a priori predict the morphologies adopted by semicrystalline polymers. The convergence of these novel experimental and theoretical developments in the venerable field of semicrystalline polymers could lead to new applications for this largest class of commercially relevant polymeric materials. With Jacques Jestin, Brian Benicewicz, Dan Zhao, Longxi Zhao