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## Nanovaterite Synthesis and Processing

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## **NANOVATERITE SYNTHESIS AND PROCESSING**

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Our collaborator, Dr. Nick Vamivakas of the University of Rochester, aims to create a *Schrödinger Cat* state in a system containing a large number of atoms, by optically trapping a sample and cooling it to near the quantum ground state. In order to decouple from room temperature chamber walls, the space surrounding the suspended sample must be evacuated. Early experiments, though promising, have not been able to maintain trapping to sufficiently low pressures. We have suggested coating the samples with a birefringent material and using optical torques to achieve gyroscopic stabilization within the trap. As a first step, we are studying nanoscale synthesis of spherical vaterite particles, *e.g.*, the relationship between size of vaterite and reaction time. The advantage of a spherical morphology is that hydrodynamic drag may be analytically calculated.