

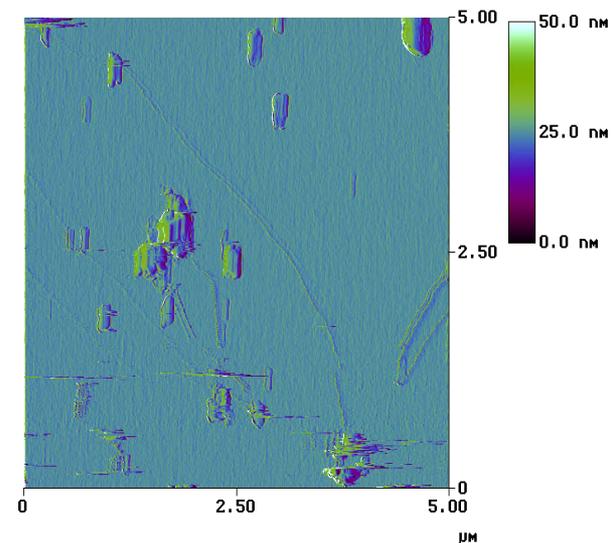
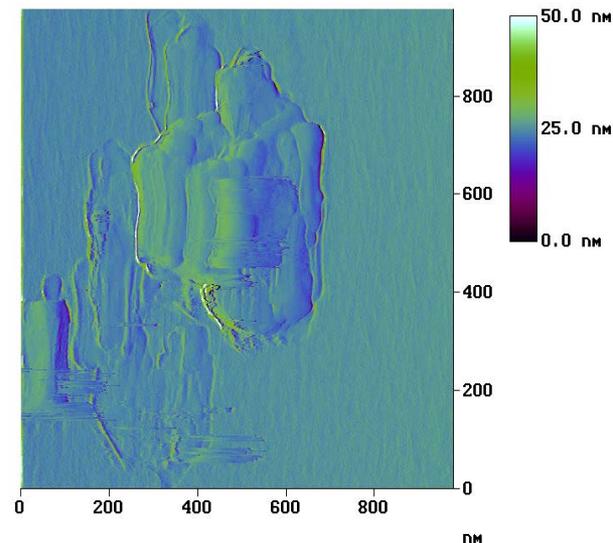
Synthesis of GaN Nanoclusters by Precursor Pyrolysis in Block Co-Polymer Cavities

Subhash H. Risbud, University of California, Davis **DMR-9730019**

GaN is a wide band gap semiconductor of great interest in electronic and photonic devices such as blue-UV lasers and flat panel displays, making the synthesis of nanocrystals or quantum dots of GaN in different matrices important. We have synthesized organized arrays of amorphous GaN nanoparticles in block copolymer cavities by using appropriate polymer precursors, and studied the optical properties of the resulting nanocomposites. **Blue light emission from amorphous GaN was observed.** Microscopic, x-ray, and photoluminescence data provides evidence of quantum confinement and **suppression** of the **undesirable yellow band emission** (470-610nm) parallel with **enhanced blue light emission** (370 nm).

Atomic Force Microscopy

AFM indicates that the GaN particles are aggregated platelets (pictured above) each containing nanoplatelets shown below. We propose to **functionalize** the surface by organic groups and align the nanoplatelets in liquid crystal polymer matrices.



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Broader Impact of Research

Graduate students (Jackie Tong, Amith Murali, Nancy Myers-Rashid, Lilian Davila), **postdoctoral fellows** (Valerie Leppert, Anil Barve, and Mathias Stender) and **undergraduate students** (Cindy Tran, Christina Zhang, Chris Pickett) have been trained through this NSF support over the past 4 years. They have all continued with successful careers in industry, national labs or academia.



Recent alums of our group (2002-2003) include Amith Murali at [Novellus](#), Jackie Tong at [Altera](#), and Valerie Leppert now a tenure-track Assistant Professor at the newest [University of California campus in Merced](#).