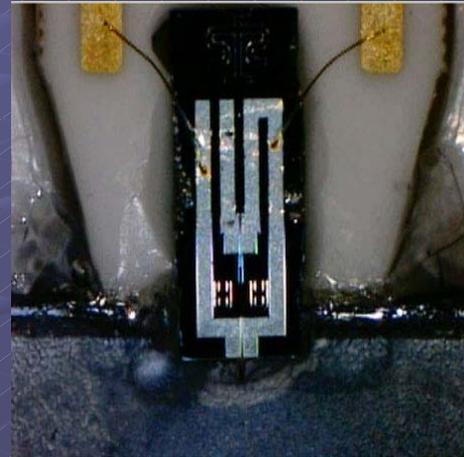


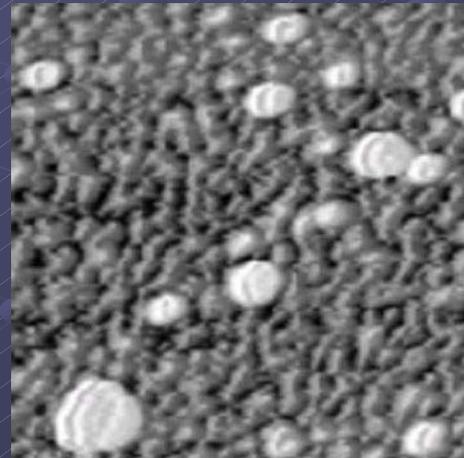
# Novel Synthesis and Applications of Polymer/Layered Silicate Composite Materials

Northern Arizona University – Timothy L. Porter, Michael P. Eastman – DMR-0071672

- Hybrid polymeric materials, including silicate mineral/polymer hybrids, metal cation/polymer hybrids, and biological/polymer hybrids have been studied and synthesized for use in tiny, MEMS-based chemical and biological sensors.
- Outcomes of this research have resulted in “microsensor” and materials partnerships with Sandia National Laboratories, DOE, and Bay Materials, LLC (CA).
- As a direct result of this project, a successful SBIR project has been initiated with Bay Materials, LLC and the U.S Army.



Embedded piezoresistive microcantilever sensor utilizing biomolecule/polymer composite material as active sensing element.



SFM micrograph showing the attachment of individual vaccinia virions to functionalized sensing material layer in embedded piezoresistive microcantilever sensor.

# Native American Undergraduate Student Research in Polymer/Layered Silicate Composite Materials

- Northern Arizona University has one of the Nation's largest Native American student populations, drawing from approximately 30 different tribes in the four-corners region.
- The primary education/outreach focus of this project is to recruit and train Native American undergraduate student researchers in chemistry and physics.
- Stipends are paid to Native American student researchers during the academic year and/or during the summer months.
- Students are recruited early, and work one-on-one with faculty on long-term, front-line research (usually 2-4 years).
- Native American students have the lowest retention and graduation rates of major ethnic groups in the U.S. (the National average graduation rate for Native American students is about 10%). However....
- The chemistry and physics graduation rate for students involved with this project approaches 100%.
- Native American students involved in multi-year projects include Shanadeen Begay, Rosie Zhine, Michelle Bradley and Lambert Benally. Lana Chavez (Hispanic) and Danielle Pace also were major contributors as students working on this project. Lana subsequently received the prestigious Beckman Scholar award in 2003.



Undergraduate student Lambert Benally connects precision flow-meter in the laboratory to test polymer-based piezoresistive microcantilever sensors on a variety of analyte gases.