



**OBJECTIVE**  
To investigate new functional ceramic materials and processing routines for the development of new devices and applications

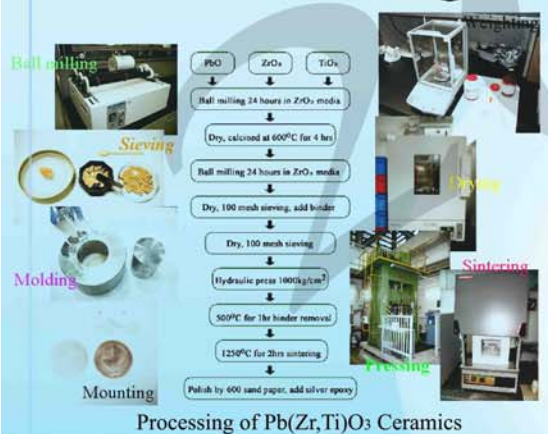
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**Research Fellows :** Dr. Eugene Kolla, Dr. Jiwei Zhai, Technician: Daniel Yau  
**Research Students :** Chan Wai Hung, Xin Li, Yingbang Yao

- Ferroelectric and Dielectric Materials
- Piezoelectric Materials
- Metal Nitrides
- Microstructure & Property Analysis

**Current Research:**

- Phase switching of antiferroelectrics thin films;
- Novel ferroelectric PST-PT relaxor;
- Nonvolatile memory devices using ferroelectrics SBT and PZT;
- Ultrasonic study of domain switching;
- Field-induced fatigue in ferroelectrics.
- Domain switching in relaxors;
- Tunable filter for microwave applications;
- Metal-nitrides and nanocomposites;
- TEM study of inter-diffusion of multi-layer ceramic capacitors.

**Bulk Ceramics Processing**



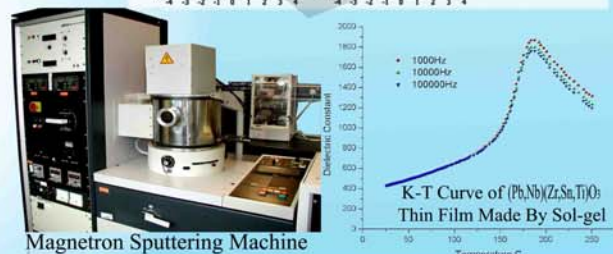
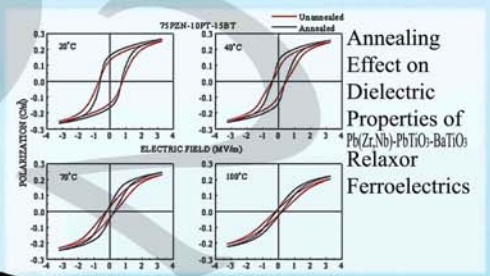
**Electro-ceramic Thin Film Fabrication & Characterization**

**Thin Film Fabrication Methods:**

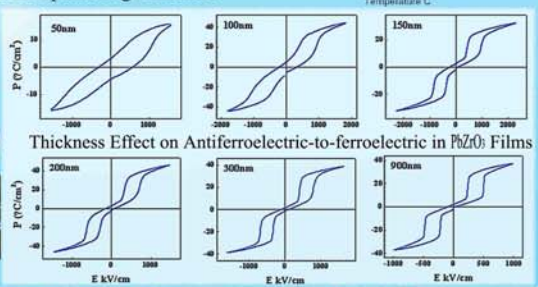
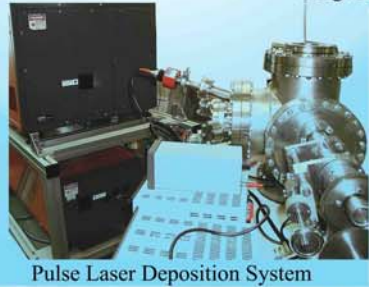
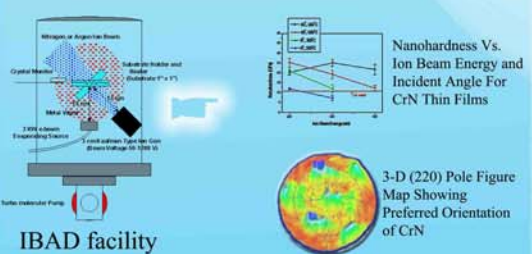
- Sol-gel;
- Magnetron Sputtering Deposition;
- Pulse Laser Deposition.

**Properties Characterization:**

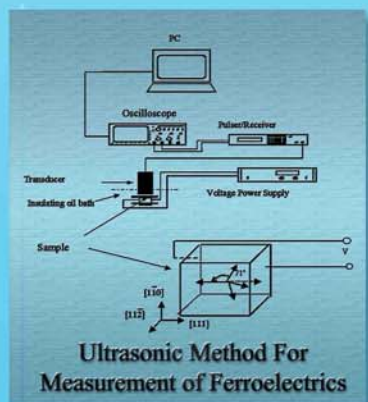
- Polarization Vs. Electrical Field,
- Dielectric Constant Vs. Temperature,...



**Ion Beam Assisted Deposition (IBAD) of Metal Nitrides**

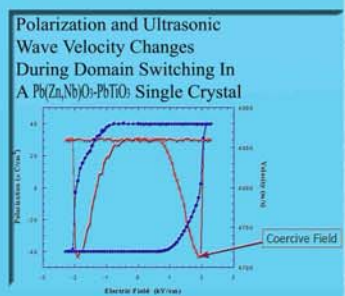


**Ultrasonic Measurements of Ferroelectrics**



**Advantages of Ultrasonic Method**

- No ultrasonic velocity change during polarization switching;
- Easy penetration for bulk materials.



**In situ TEM Study of Microcracking & Fatigue**

