Title of Project: Functional properties of transitional metal oxide thin films

Name of Supervisor: Prof. Zeng Kaiyang

Contact Details: Department of Mechanical Engineering, 9 Engineering Drive 1, National University of Singapore mpezk@nus.edu.sg; (+65) 6516 6627

Short Description

This project is to use various advanced Scanning Probe Microscopy techniques, such as Piezoresponse Force Microscopy (PFM), Kelvin Probe Force Microscopy (KPFM), conductive Atomic Force Microscopy (c-AFM), to study the nanoscale structure, domain structure, polarization switching behavior, electron transportation, resistive switching and charge/polarization storage in transitional metal oxide thin films, such as ZnO, BiFeO3, TiO2, NiO etc. The focus of the research is to understand the mechanisms of resistive switching and their effects to other functional properties such as polarization switching, conductivity, as well as work function of the materials. In addition, the functions of redox reactions in those materials will also be studied.

Selected References: