

Soft X-ray Absorption Spectroscopy Investigation on Advanced Semiconductor and Oxide Materials for Taiwan Industry and Development

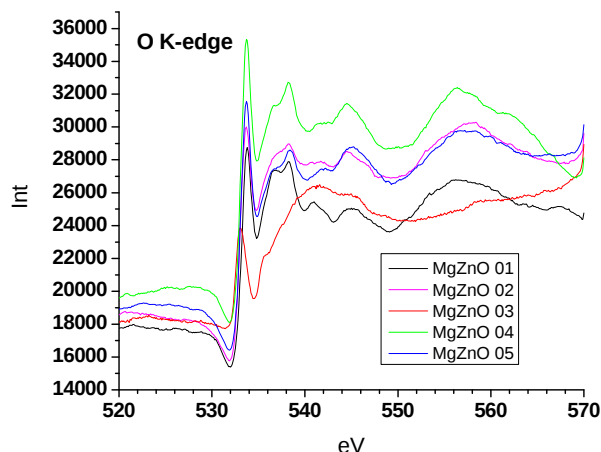
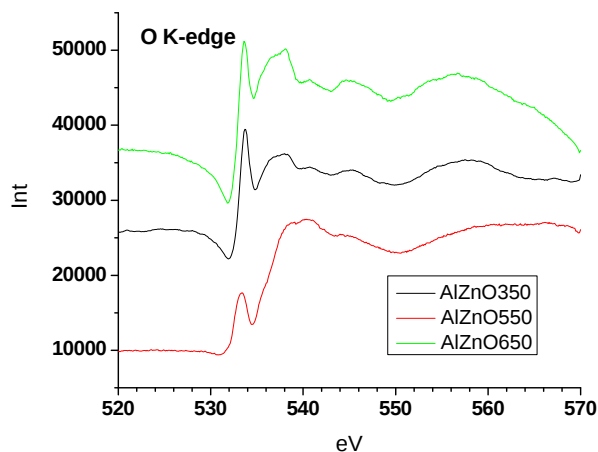
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ZnO (Zinc oxide) has several favorable properties: good transparency, high electron mobility, wide bandgap, strong room-temperature luminescence, etc. Those properties are already used in emerging applications for transparent electrodes in liquid crystal displays and in energy-saving or heat-protecting windows, and electronic applications of ZnO as thin-film transistor and light-emitting diode are forthcoming as of 2009. We have recently employed the National Synchrotron Radiation Research Center (NSRRC) beamline 20A of Soft X-ray Absorption Spectroscopy for both K-edge and L-edge of Zn and O X-ray absorption measurements on a series of ZnO materials. Also we take different incident angles on our measurement. The following figures are parts of our experiments.

Two figures below show the O K-edge X-Ray absorption in different light incident angles, we observe that in different grown conditions make SK290 and SK268 XANES peaks around 530 to 540 electron volt more distinguishable. Moreover, both two samples in different light incident angles show a little bit shifted.



Indeed, quite a lot of significant and fruitful results for over 20-samples have been obtained. Still some of the phenomenon need to be explained and be figured out, we are striving toward to complete analysis. High intensity synchrotron radiation technology is approved to be a powerful tool for materials fundamental research on these wide band gap semiconductors, and it can play an important role to promote research in this field.