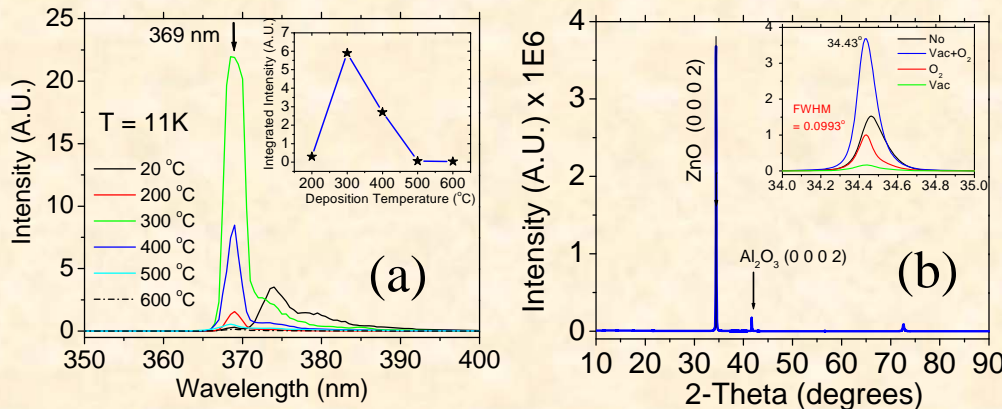




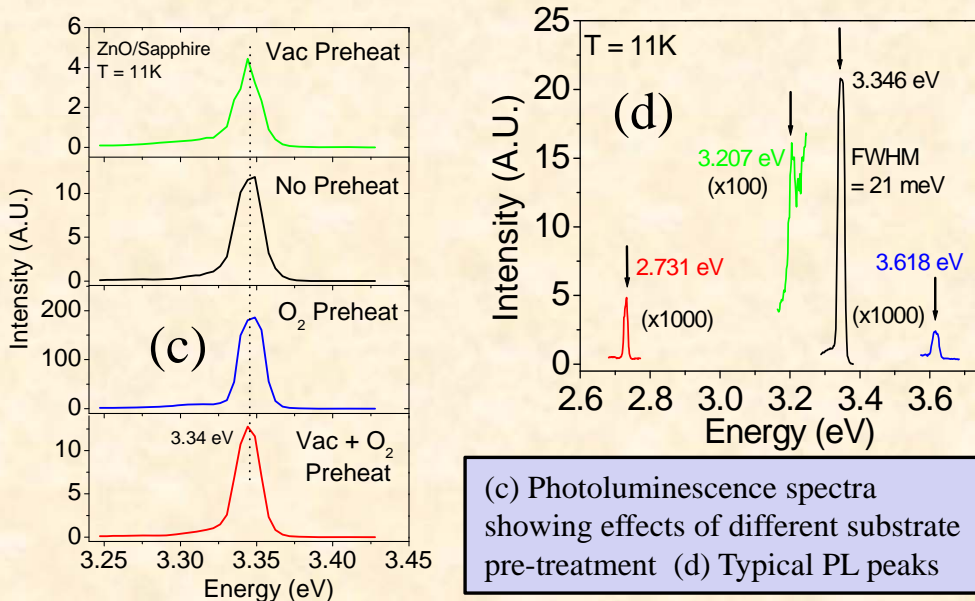
RUI: Growth and Characterization of Epitaxial ZnO Films for Device Applications: DMR-1006083



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ZnO films deposited on sapphire at different temperatures:
(a) Photoluminescence spectra (b) XRD 2-theta scans



(c) Photoluminescence spectra showing effects of different substrate pre-treatment (d) Typical PL peaks

Goal: Develop p-type ZnO using delta-doping by sputter deposition. Spatial confinement of the p-type doping atoms would result in a 2D doping density profile with a unique V-shaped potential well, which exceeds the solubility limit of homogeneous doping.

Results: Optimized film growth by sputter deposition: O₂ preheat (500 °C/30min) substrate temp (300 °C), Deposition gas pressure (20 mTorr, Ar/O₂), RTP Annealing (900 °C/5min, N₂).

Students: 5 undergraduates, 1 graduate, 1 high school.

Future Work: Delta doping with N₂, As, P atoms.