

Abstract Submitted  
for the OSS11 Meeting of  
The American Physical Society

**Optimizing Deposition gas and Annealing Conditions for ZnO Films**<sup>1</sup> ANDREW SMITH, TOM ODER, Youngstown State University — Zinc Oxide (ZnO) is a transparent II-VI semiconductor with a direct band gap and has potential applications for making efficient optoelectronic devices such as laser diodes and light emitting diodes as well as in solar panels, taking advantage of its transparency. ZnO films have been deposited onto sapphire using radio frequency sputtering in different gases including nitrogen and different mixtures of argon and oxygen. The films were then annealed for different durations at 900 °C and characterized using photoluminescence spectroscopy measurements with a HeCd laser to examine the crystal quality of the samples. The conditions that give the best quality film were for films deposited in 100% argon at 500 °C. The optimum annealing condition was 3 min and five minutes. Photoluminescence analysis yielded peaks at 377 nm for each sample measured at room temperature 368 nm at 10 K. It was also found that pre-heating the sapphire substrate in pure oxygen prior to deposition greatly improves the quality of the ZnO film.

<sup>1</sup>We acknowledge the support from NSF (# DMR 1006083).

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Date submitted: 25 Mar 2011

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