Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

MBE-grown Nd:Y_xAl_yO solid state laser crystals: Compositional control leading to films of the primary phases YAG, YAP and YAM
RAVEEN KUMARAN, SCOTT WEBSTER, SHAWN PENSON, WEI LI, University of British Columbia, TOM TIEDJE, University of Victoria — Solid state laser crystals with planar waveguide geometry are useful for making compact and efficient integrated laser devices. Among the techniques for growing thin film laser crystals, molecular beam epitaxy offers better compositional control due to independently operated elemental sources. By varying the growth temperature and flux ratios of Y, Al and O_2, we have grown all the primary phases in the ternary yttrium aluminum oxide system: $Y_3Al_5O_{12}$ (YAG), $YAlO_3$ (YAP) and $Y_4Al_2O_9$ (YAM). The films were doped with Nd to make them optically active and the resulting emission spectra consisted of peaks unique to the surrounding host material. The emission spectra were similar to those from bulk crystals indicating that the films were single phase. The Nd emission was also useful for verifying structural and compositional characterization results from x-ray diffraction and x-ray photoelectron spectroscopy. Among the 3 phases, Nd:YAG is the most widely used laser material, with a wavelength corresponding to the strong emission peak at 1064nm.

Raveen Kumaran

Date submitted: 29 Nov 2009 Electronic form version 1.4