4-4-1998

Urea Crystal Optical Parametric Oscillator

Erik Thoreson

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/stu_symp1998

Recommended Citation
http://opus.ipfw.edu/stu_symp1998/5

This Presentation is brought to you for free and open access by the IPFW Student Research and Creative Endeavor Symposium at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in 1998 IPFW Student Research and Creative Endeavor Symposium by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.
UREA CRYSTAL OPTICAL PARAMETRIC OSCILLATOR
Erik Thoreson
(Mark Masters, Assistant Professor of Physics)
Department of Physics

Optical Parametric Oscillators (OPO's) are effective at providing tunable light over a broad range of wavelengths. An OPO is a non-linear device. This means the index of refraction is not a constant as a function of intensity or wavelength for the light that enters the crystal. A major factor in the nonlinear effects of the crystal is the structure.

In the present experiment, a UV nitrogen laser beam will be focused through a urea crystal to produce visible light. In this presentation, I will discuss the construction of a nitrogen laser, construction of a crystal-growing apparatus, and the process of growing an OPO crystal.

A number of methods have been attempted, in growing the urea crystals as a suitable OPO. These different methods include slow evaporation, slow cool down, and sublimation. Various solvents were used to determine which was the best. A methanol solution (100%) was observed to provide the best results. If the solute (urea) is too soluble in the solvent (methanol solution), good seed crystals cannot be obtained. The methanol solution has produced crystals on the order of 1 x 2 x 10 mm, which is a good size for a seed crystal. A clear crystal of dimensions 8 x 15 x 10 mm needs to be grown. Then the crystal can be used as an effective OPO. In order to grow the crystals of sufficient size, an apparatus needs to be constructed. Currently, the apparatus is under construction.