

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Development of a Wafer Fusion Process for Producing Patterned GaP Templates** KRONGTIP TERMKOA, VAIBHAV MATHUR, XIFENG QIAN, WILLIAM GOODHUE, Photonics Center, Dept. of Physics and Applied Physics, University of Massachusetts Lowell, DAVID BLISS, Air Force Research Laboratory/RYHC, Hanscom AFB, RITA PETERSON, Air Force Research Laboratory/RYJW, Wright-Patterson AFB — Quasi-phase-matching (QPM) is an effective technique for nonlinear optical frequency conversion to generate IR wavelengths not readily available from direct laser sources. The QPM gratings can be produced by electric field poling in ferroelectric oxide materials, or by crystal growth of alternating phase domains in the case of semiconductors. For semiconductor materials GaAs and GaP we are developing new patterning methods to produce optical gratings for QPM. The state of the art for producing orientation-patterned GaAs material is already well developed. Gallium phosphide (GaP), also transparent at IR wavelengths, is attracting interest for nonlinear optical frequency conversion due to its high second-order nonlinear susceptibility, high thermal conductivity, wide band gap and low optical loss. Here we report a method to fabricate a GaP periodic domain inversion template using a process combining wafer fusion, substrate removal, lithographic patterning, and wet/dry etching.

Shivashankar Vangala  
Photonics Center, Dept. of Physics and Applied Physics,  
University of Massachusetts Lowell

Date submitted: 24 Nov 2008

Electronic form version 1.4