Development of a 1.067 µm CW Diode Pumped Nd:KGW Laser with Reduced Quantum Defect

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Neodymium-doped potassium gadolinium tungstate [Nd:KGd(WO4)2; Nd:KGW] is one of the most energy efficient solid state laser crystal. The properties of Nd:KGW are very much similar to the well known and widely used Nd:YAG laser crystal. However, Nd:YAG has some shortcomings such as high Nd doping would result in concentration quenching and crystal degradation. On the other hand, Nd:KGW offers approximately twice the energy efficiency of Nd:YAG with an emission wavelength of 1.067 µm. It also has a larger emission cross-section than Nd:YAG and can generate self-stimulated Raman scattering [1]. This properties enable Nd:KGW for medical applications such as Resonance Raman Spectroscopy, Surface-Enhanced Raman Spectroscopy (SERS) etc [2]. To make Nd:KGW crystal more efficient, We would like to pump with a diode at 914 nm in CW regime instead of conventional 808 nm pumping. This 914 nm diode pumping scheme will reduce the quantum defect between the pump and laser photons. Laser emission at 1.067 µm will be observed and we are expecting a higher output power because of this less quantum defect. Therefore, our goal is to build an efficient diode pumped Nd:KGW laser with less quantum defect and hence high average output power in CW regime.

REFERENCES
