

Thulium channel waveguide laser with 1.6 W of output power and $\sim 80\%$ slope efficiency

K. van Dalfsen,¹ S. Aravazhi,¹ C. Grivas,² S. M. García-Blanco,¹ and M. Pollnau^{1,*}

¹*Integrated Optical MicroSystems Group, MESA+ Institute for Nanotechnology, University of Twente,
P.O. Box 217, 7500 AE, Enschede, The Netherlands*

²*School of Physics and Astronomy, University of Southampton, Southampton SO17 1BJ, UK*

**Corresponding author: m.pollnau@utwente.nl*

Received April 17, 2014; revised June 20, 2014; accepted June 20, 2014;
posted June 24, 2014 (Doc. ID 210210); published July 22, 2014

Laser experiments were performed on buried, ridge-type channel waveguides in 8 at.% thulium-doped, yttrium–gadolinium–lutetium co-doped potassium double tungstate. By pumping with a Ti:sapphire laser at 794 nm, 1.6 W of output power at 1.84 μm with a maximum slope efficiency of $\sim 80\%$ was obtained in a laser resonator with a high output-coupling degree of 89%. To the best of our knowledge, this result represents the most efficient 2- μm channel waveguide laser to date. © 2014 Optical Society of America

OCIS codes: (130.3130) Integrated optics materials; (140.3070) Infrared and far-infrared lasers; (140.3580) Lasers, solid-state; (230.7380) Waveguides, channeled; (310.6845) Thin film devices and applications.

<http://dx.doi.org/10.1364/OL.39.004380>