Efficient generation of 1.9W yellow light by cascaded frequency doubling of a distributed Bragg reflector tapered diode

Watt-level yellow emitting lasers are interesting for medical applications, due to their high hemoglobin absorption, and for efficient detection of certain fluorophores. In this paper, we demonstrate a compact and robust diode-based laser system in the yellow spectral range. The system generates 1.9 W of single-frequency light at 562.4 nm by cascaded single-pass frequency doubling of the 1124.8 nm emission from a distributed Bragg reflector (DBR) tapered laser diode. The absence of a free-space cavity makes the system stable over a base-plate temperature range of 30 K. At the same time, the use of a laser diode enables the modulation of the pump wavelength by controlling the drive current. This is utilized to achieve a power modulation depth above 90% for the second harmonic light, with a rise time below 40 μs.