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Title

Continuous-wave and passively Q-switched Nd:LYSO lasers

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Abstract

Continuous-wave (CW) and passively Q-switched performance of a Nd-doped oyorthosilicate mixing crystal, (Nd_{0.005}Lu_{0.4975}Y_{0.4975})₂SiO₅ (Nd:LYSO), were reported. As a result, new dual-wavelength all-solid-state lasers at 1075 and 1079 nm were achieved. When the absorbed pump power was 3.87 W, the CW laser produced 1.1 W output, corresponding to an optical conversion efficiency of 28.4% and a slope efficiency of 32.4%. By using a Cr⁴⁺:YAG wafer as the saturable absorber, we achieved Q-switching operation of Nd:LYSO crystal. The maximal average output power, shortest pulse width, largest pulse energy and highest peak power were measured to be 294 mW, 27.5 ns, 34.3 J and 1.18 kW, respectively. By difference frequency, these dual-wavelength lasers have potential applications for the generation of a broadband coherent radiation from 0.7-1.3 THz. (34 References).