

L-band Q-switched fiber laser with gallium/thulium-doped silica fiber saturable absorber

ABSTRACT

An L-band Q-switched fiber laser was demonstrated using gallium/thulium-doped silica fiber saturable absorber. At 10 cm in length, the saturable absorber generated Q-switched fiber laser at a pump power threshold of 39.6 mW and a central wavelength of 1601.93 nm. Beyond 53.3 mW, a spectrum with a central wavelength at 1602.00 nm was generated. On the other hand, the pulse repetition rate was obtained from 3.44 to 7.47 kHz whereas the pulse width reduces from 100.2 to 58.6 μ s for pump power ranges from 39.6 to 53.3 mW. Within this range, the pulse energy is attained between 0.2600 and 0.2843 μ J, at a laser power slope efficiency of 6.94%. The constantly operated Q-switched fiber laser over 50 min observation time at 53.3 mW pump power ensures the feasibility of this pulse laser source as a practical device.

Keyword: Q-switching; Fiber laser; Gallium; Thulium-doped fiber; Saturable absorber