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Tunable wavelength Er:Yb double clad single mode fiber lasers

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ABSTRACT

Actively Q-switched fiber lasers have been investigated extensively due their applications in remote sensing, medicine, and terahertz generation, etc. This technique is usually achieved to improve pulses stability and higher pulse energies. Several active Q-switched fiber laser configurations based in the use of free-space, all-fiber or fiber pigtail acousto-optic and electro-optic modulators have been reported. Moreover, double-clad fibers (DCFs) are attractive as gain medium due their high conversion energy feature. Recently, we have reported an Er/Yb DCF tunable laser in continuous wave (cw) and actively Q-switched fiber laser using a fiber Bragg grating (FBG) as wavelength selective in a linear cavity resonator. The laser was tuned in a range from 1532 to 1542 nm for both cw and pulsed mode. The minimum pulse durations were obtained with 420 ns at a repetition rate of 120 kHz and ~0.7 W average output power in cw and 1.03 W average output power in pulsed mode. In other configurations, we reported an actively Q-switched dual-wavelength fiber laser using an Er/Yb DCF in a linear cavity limited by a pair of FBGs in one side, and a Sagnac interferometer in the other side. We also have reported a tunable dual-wavelength actively Q-switched Er/Yb DCF laser using a polarization maintaining FBG for both generated laser wavelengths tuning. In other configuration, we reported a ring cavity dual-wavelength fiber laser with an Er/Yb DCF. A pair of FBGs are used to generate laser lines tuning. By mechanical compression/stretch applied on the FBGs the laser generated wavelength maximal separation was ~4 nm. With a pulse duration of 180 ns, we obtained a pulse energy of ~3 μJ and a peak power of ~16.8 W. In this work we make a review of our previous work in the area of tunable fiber lasers.