Original Articles

Pure antimony film as saturable absorber for Q-switched erbium-doped fiber laser

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Abstract

This paper reports on the use of Antimony (Sb) polymer film to generate stable Q-switching pulses in Erbium-doped fiber laser (EDFL) cavity. The SA is fabricated by coating a thin layer of Sb on a polyvinyl alcohol (PVA) film through physical vapour deposition (PVD) process. A 1 x 1 mm area of the film SA is cut and integrated into between two fiber ferrules inside the laser cavity for intra-cavity loss modulation. Self-starting and stable Q-switched pulses are obtained within a pump power range from 60 to 142 mW. Within this range, the repetition rate increases from 70.82 to 98.04 kHz, while pulse width decreases from 7.42 to 5.36 µs. The fundamental frequency signal-to-noise ratio of the pulse signal is 74 dB, which indicates the excellent stability of the pulses. The maximum output power and pulse energy are 8.45 mW and 86.19 nJ, respectively. Our demonstration shows that Sb film SA capable of generating stable pulses.