Pulse compression in Q-switched fiber laser by using platinum as saturable absorber

ABSTRACT

This paper reported a successful demonstration on pulse compression in Q-switched fiber laser by using platinum, Pt as saturable absorber (SA). The Pt-SA is deposited through sputter deposition method. The modulation depth of Pt-SA is 46.5% with a saturation intensity of 1.4 MW cm^{-2}. The Pt-SA is integrated into the laser cavity to compress the pulse width in Q-switching operation. At the maximum pump power, only a small repetition rate of 29.2 kHz is needed to compress the pulse width to 1.8 µs. Meanwhile, the optical signal-to-noise ratio is about 43.0 dB. The Q-switched pulses have the maximum pulse energy of 6.5 nJ. Based on the findings, Pt has the ability to become an effective SA in generating Q-switched and pulse compression which may lead to further development of pulsed fiber laser.

Keyword: Q-switched fiber laser; Platinum; Pulse compression; Sputter deposition method; Saturable absorber