

Evanescent field interaction of 1550 nm pulsed laser with silver nanomaterial coated D-shape fiber

ABSTRACT

The paper presents a newly developed fiber-based saturable absorber (SA) operating at 1550 nm waveband. The fiber-based-SA constructed from side-polished fiber called D-shape fiber and with deposited silver nanoparticles act as a nonlinear material for ultrafast laser generation. The interaction between silver nanoparticles and exposed oscillated laser light in cavity were due to evanescent wave (EW) field phenomenon with 1.44% of modulation depth recorded. Stable pulse train of ~ 1.00 MHz with 2.24 ps pulse width, 10.73 nJ pulse energy, 77.83 dB high signal to noise ratio and 11 mW output power at 1563.24 nm were achieved. Our findings suggests that the properties owned by silver-coated D-shaped fiber via EW can be a great alternative towards conventional film saturable absorber.