All-fiber high-energy mode-locked ytterbium-doped fiber laser with bismuth telluride nanosheet saturable absorber

ABSTRACT

Utilizing bismuth telluride (Bi_2Te_3) nanosheet saturable absorbers (SA), a remarkable source of continuous-wave infrared radiation known for its high efficiency and wide range of accessible wavelengths, has been successfully developed. The mode-locking bright pulses have a repetition frequency of 9.5 MHz and a pulse width of 0.6 ps at a power level of 203.5 mW. The optical spectrum has its center at 1050.23 nm and delivers pulse energies of 2.13 nJ and output power of 20.3 mW. Using a straightforward 18 m long ring design and a laser cavity with a −19.9 ps2/km dispersion, a 44 dB signal-to-noise ratio (SNR) was achieved to demonstrate the pulse's strong stability.