

# High quality 2- $\mu\text{m}$ Q-switched pulsed solid state lasers using spin coating-corededuction approach $\text{Bi}_2\text{Te}_3$ saturable absorber

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**Abstract:** In this work, the fabrication process and characterization of  $\text{Bi}_2\text{Te}_3$  topological insulators (TIs) synthesized by the spin coating-corededuction approach (SCCA) are reported. By employing these prepared TIs with different thickness as SAs in 2  $\mu\text{m}$  solid-state Q-switched lasers, thickness-dependent output powers and pulse durations of the laser pulses are obtained and the result also exhibits the stability and reliability from their hourly operation. In comparison with the TISA synthesized by the ultrasound-assisted liquid phase exfoliation (UALPE) method, the experimental results show that lasers with SCCA synthesized TISAs have higher output powers, shorter pulse durations and higher pulse peak powers.