

*Oddělení diodově čerpaných laserů, sekce výkonových systémů,
a realizační tým projektu HiLASE
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Transparent magneto-optic TGG ceramics for the high energy and high power laser applications

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The terbium gallium garnet (TGG) ceramic based Faraday isolator irradiated with a kW level laser and a 35 dB extinction ratio, including compensation for thermally-induced depolarization was demonstrated experimentally, and the thermo-optic effects of thermal birefringence, thermal lens effects, and time stability due to heating were evaluated. From the evaluation of the experimental results, we find that this isolator maintains an isolation ratio of 30 dB up to a laser power of 2.7 kW. This ceramics-based Faraday isolator is scalable to large optical apertures (10 cm x 10 cm). This isolator can be used in a high-energy pulse laser system with an average power of 1 kW. Our results provide the solution for achieving the isolation and the magneto-optic effect based polarization control method in high-energy (100 J to kJ) laser systems with a repetition rate of over 10Hz. The TGG ceramic-based Faraday isolator will assist and accelerate the development of high-energy laser-driven applications.

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