

New method to grow large core free YAG crystals

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A new crystal growth method CRIG (CRystal Improved Growth) has been developed to grow large (currently 125 mm in diameter) core-free single crystals of yttrium aluminum garnet (YAG). Using this method [1], crystals of unmatched quality are produced – size, homogeneity, low stress etc. The growth of 5 inch un-doped YAG for optical elements as well as YAG:Ce for scintillating screens and Yb:YAG for solid-state laser systems has been accomplished in CRYTUR spol. s r.o.

Two types of laser elements were cut and polished from these Yb:YAG crystals: disc of diameter 80 mm × 8 mm thickness and square slab with dimensions 120 × 100 × 8 mm. The wavefront distortion of laser-quality polished crystals was smaller than $\lambda/20$ (λ of HeNe laser = 633 nm) in its Peak/Valley value. This indicates very low level of internal stress in the optically perfect flat surface of the crystal. The laser surface finishing parameters measured on the smaller disc are: Scratches/Digs 10/5, parallelism ; 1' arc min. Such large laser slabs are being finalized in collaboration with ELI beamlines project (Extreme Light Infrastructure) in the Czech Republic.

[1] Jindrich Houzvicka, Karel Bartos, patent EP 2675944 A1