

# Volume crystals for extremely high radiation levels

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In last two decades a large number of scintillator materials including inorganic crystals have been studied and optimized and their properties are now well understood. Depending on the application, a material is selected to fulfill the most important properties and eventually its further improvement is considered.

In calorimetric detectors at high luminosity colliders in high energy physics, the properties of critical importance are the radiation resistance, speed of scintillation response and up to a lesser extent the light output and density.

As these applications usually require a large volume of scintillation materials its cost becomes also important and is influenced by the price of raw material, the material preparation method and production yield and final manufacturing of the scintillation element.

A new crystal growth method CRIG (CRystal Improved Growth) has been developed to grow large core-free single crystals of yttrium aluminum garnet (YAG).

Using this method [1], the crystals of unmatched quality are produced as for the size, homogeneity, low stress etc.

The growth of 6 inch diameter undoped YAG as well as YAG:Ce has been accomplished in CRYTUR spol. s r.o. This technology can be essential in its application in large scale detectors in high energy physics where single crystals of YAG:Ce is also considered.

The characteristics of CRIG grown method will be presented together with the properties of YAG:Ce standard scintillator. First steps for optimization of YAG:Ce scintillator for high energy physics application will be discussed as well.

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## Summary

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