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## Effect of crucible shape on heat transport and melt-crystal interface during the kyropoulos sapphire crystal growth

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### Abstract

In this work, a special crucible shape with a round shape for the outer wall and an inverted conical shape for the inner wall is presented to investigate the thermal and flow transport, as well as the shape of the crystal-melt interface during the Kyropoulos sapphire crystal growth, by using the numerical simulation method. The results show that the growth system with the proposed crucible shape can get a most suitable thermal and flow fields and that the convexity is lower at the shouldering and equal-diameter growth stage while became higher at the follow stage, which is advantageous to the quality of the sapphire crystal.

### 1 Introduction

Recently, high quality sapphire crystals of large size and weight had been widely used in a variety of modern high-tech applications as the combination of desirable optical and mechanical properties [1-3], including the fields of infrared window,

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