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Position effects of mirror–lamp system on the growth of rutile crystal based on the infrared convergent-heating floating zone method

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Abstract:

The position effects of a mirror–lamp (M–L) system on the growth of a rutile crystal by using the infrared convergent-heating floating zone (IR-FZ) method was systematically investigated. Compared with the conventional IR-FZ method, the molten zone for the M–L system was stabilized at a distant position and a large rutile crystal could be grown. However, the roughness of the interface shapes between the feed and molten zones increased at the more distant position of the M–L system. The slower rotation rate of the feed was found to be effective for smoothing the rough feed-side interface.

The results of this study showed that the position of the M–L system and rotation of the feed are key factors for the stable growth of a single rutile crystal with a large diameter by using the IR-FZ method.

Keywords: A1. Heat transfer, A2. Floating zone technique, A2. Growth from melt, B1. Oxide, B2.

Titanium oxide

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