Electronic Supplementary Information

Increased concentration of Yb$^{3+}$ and high crystal field strength in RbTiOPO$_4$:Ta single crystal with optimized growth

Ziqing Li $^{1,2}$, Pengfei Zhu $^1$, Jimin Ding $^1$, Nianjing Ji $^1$, Yang Chen $^1$, Zhenyan Wang $^1$, Xiulan Duan $^1$, Huaidong Jiang $^{1,2}$*

$^1$ State Key Laboratory of Crystal Materials, Institute of Crystal Materials, Shandong University, Jinan 250100, PR China

$^2$ School of Physical Science and Technology, ShanghaiTech University, Shanghai 201210, PR China

Figure S1. Photograph of as-grown RTP:Ta crystal using crystallographic $a$ direction seed. The polymorphism was obviously observed in the layered crystal.

Figure S2. Photograph of the broken RTP:Ta:Yb crystal under the stepped cooling rate of 0.50-0.67 °C/day. The severe inclusions and cracks were grown in the crytsal.
**Figure S1.** Photograph of as-grown RTP:Ta crystal using crystallographic $a$ direction seed. The polymorphism was obviously observed in the layered crystal.

**Figure S2.** Photograph of the broken RTP:Ta:Yb crystal under the stepped cooling rate of 0.50-0.67 °C/day. The severe inclusions and cracks were grown in the crystal.