Single-crystal synthesis of ruby



We raise the temperature to the highest and retain it for 8 hours , and lower it by 10 degrees in every one hour to 30 degrees.



The lowering time

 $\begin{array}{cccc} {\sf Cr2O3} & 0.90{\rm g} \\ {\sf Al2O3} & 0.10{\rm g} \\ {\sf Cryolite} & 4.00{\rm g} \end{array} \right) 1.00{\rm g}$

Cryolite 4.00g We raise the temperature to 1100 degrees and lower it gradually.



 $5 {\rm degrees} ~{\rm an}~ {\rm hour}$

 $0.5 {\rm degrees} ~{\rm an}~{\rm hour}$

We had the ruby of the size of 1mm. In addition, we understand that it is a crystal of aluminum oxide from a result of the X-ray diffraction.

lower it by 5degrees in every one hour to 8odegrees.

 Al_2O_3

0.70g

 Cr_2O_3

0.30g

7:3

Al₂O₃:Cr₂O₃

 Al_2O_3

0.80g

 Cr_2O_3

0.20g

8:2

low <

 Al_2O_3

0.60g

 $\operatorname{Cr}_2 O_3$

0.40g

6:4





Al 2 O 3

0.40g

 Cr_2O_3

0.60g

4:6

high

- 5.Summary
 - $\cdot\,$ The higher temperature is, the redder color is.
 - The higher the ratio of chromium oxide is, the redder color is.
 - So, the size of the ruby gets biggest when we lower the temperature gradually.