

Handout for MIT ESP Class-Crystals & Crystallography Nov 2023

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Hello! I hope you enjoyed my class last weekend, and that you will look into additional Education Studies Program classes in the future. I was a student in MIT's High School Studies Program for 3 years when I was in high school, and it was fantastic for me. ESP greatly broadened my science education and my E.S.P. background helped me choose where to go to college, and what classes to take in college.

Below are some additional references & notes about crystals and crystallography, in case you would like to learn more about the subject.


A: Video about making sapphire in a factory:

Below is a link to a 3 minute video from 2014 about the manufacturing of large sapphire cylinders for smartphone display applications. The company name is GT sapphire <https://www.youtube.com/watch?v=H-x7XMPaWIE>

I have included 2 screenshots from the video below.

 YouTube
<https://www.youtube.com/watch?v=H-x7XMPaWIE>

GT Advanced - Sapphire Glass Production - YouTube

 **GT Advanced Technologies** - <http://www.gtat.com/GT> Crystal Systems **sapphire** is recognized as the highest commercial quality **sapphire** ...
YouTube · Kesia Tamara · Jul 22, 2014

6 key moments in this video ^

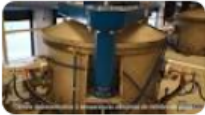




				
From 00:25 Making Sapphire	From 00:36 Sapphire Seed	From 00:55 Melting Process	From 01:50 Making Smartphone Displays	From 02:38 Cost Factors

Photo1 : Overview of key steps in video from GT Sapphire Manufacturing Process

GT Advanced - Sapphire Glass Production

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In this video

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Related topics

Photo 2: Picture of sapphire boule after 17 day processing cycle. The sapphire boule is clear because it has very low level of impurities

This factory uses very pure aluminum oxide and sapphire scrap from previous runs as the starting materials to make these sapphire boules, using 2200 degree C (3992 F) furnaces. GT sapphire is not the factory I used to work at as an engineer. I worked at a different sapphire factory, but my factory did not have any online videos that I could show you.

2b. Here are a few references that you might find interesting.

R O W	Description	Details and/ or web link	Comment
1	Montana mine where I purchased the sapphire gravel.	https://gemmountainmt.com/	
2	A very nice chart to decorate your room if you like crystals.	Introduction to Minerals Geology Laminated Educational Science Classroom Chart 24x36	Asin : B0110V4VIM. Amazon link, about \$15 https://a.co/d/15DcGEQ
3	A book I showed in class with beautiful pictures of crystals.	Minerals by George Robinson, 1994	Sometimes used copies can be found very cheap online(<\$10).
4	Great origami book if you like geometry and if you like origami.	The Complete Book of Origami Polyhedra, 2022 by Tomoko Fuse	This is an advanced book: paperback is about \$15. Also a kindle version.