

PHIL: The prize for the biggest crystal is a lunch with John and the TAs at Legal Seafood, which I'm personally very excited about.

[MUSIC PLAYING]

NARRATOR: Today the students are going to learn a totally different technique, recrystallization.

PHIL: Pesticides, pharmaceuticals, food colorings, and products where they have to produce tons per year, recrystallization is the key method. Yesterday you were working with about 100 megs of each compound. Today, you're going to be working with 2 grams.

NARRATOR: But there's more on the line than just getting those 2 grams back. This is practice for next week's crystal competition. If the students do well, they'll have a better shot at winning a free lunch with the teaching staff.

The first step in a recrystallization is to choose the right solvent. The students need a liquid that will not dissolve the target molecule when it's cold, but will dissolve it when it's hot. The students then dissolve the sample in hot solvent and filter out any solid impurities. Then they cool it down in an ice bath. The target molecule should crystallized out of solution forming a pure solid. The impurities should stay in the liquid.

ANTHONY: Fresh.

IKE: Yep. That's how we want it. Crystal clear.

NARRATOR: Ike, Ethan, and Anthony are having no problems at all.

ETHAN: Ain't nothing too hard for an MIT chemist.

NARRATOR: Hansol, Jason, and Fred on the other hand--

HANSOL: I made like two, actually three mistakes today.

JASON: I've made so many stupid mistakes today.

HANSOL: Yeah, I didn't realize it would heat that fast.

FRED: Um, it exploded all over the side of my flask.

HANSOL: And then it exploded, so then I had to start over.

PAUL: It started sputtering out and actually it was kind of scary. Some of it almost like hit me in the face.

JASON: I've broken a test tube.

HANSOL: And then I put it through a small funnel which was a total mistake.

JASON: I put too much solvent losing some product.

HANSOL: The funnel, I just dropped it. So--

JASON: The yield on this is almost nothing.

NARRATOR: After filtering, washing and drying, everyone eventually makes it to the final step, weighing the purified crystals. Getting 90% yield is the goal. That would be 1.8 grams of the original crystal.

LEALIA: So far my yield says 1.9 grams. So I don't know if that's right because there is only supposed to be two grams.

JULIE: That's probably not going to be that good because that all I have. There were some problems with filtering and then also noticed trying to put the stuff in the beginning, I spilled it everywhere.

YI-SHIUAN: Is it really pure?

JULIE: 7%.

LEALIA: 101% yield.

JULIE: Good job.

JASON: 3%. So besides 3% yield, my melting point's almost perfect.

NARRATOR: For some today, a good start. For others--

JASON: 3% yield. You needed 90%. I only got 3%.

NARRATOR: Not looking so hot for next week. Tune in, and see how it all unfolds.

PHIL: Just make observations, write down what could have went wrong, what you could do differently next time.

JASON: Not spill. Sleep more beforehand so I don't make mistakes. Not spill.

PHIL: Take your vitamins.

JASON: Not be an idiot. I don't know.

[MUSIC PLAYING]