

Chemical plating

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When TLC goes 3-D

Do chemists really shell out \$750 for a piece of lab equipment just to cut glass? That's what Ramesh Jasti, a chemistry professor at the University of Oregon, asked chemists **on Twitter** back in October. He was bemoaning the price of cutters for thin-layer chromatography plates.

And they are expensive. "Simply score the back of a coated plate and snap off the exact size you need," touts the description of **one such cutter**, which retails for \$945.

Upon seeing Jasti's tweet, one of his former graduate students, Evan Darzi, **tweeted back**, "I'd bet some savvy 3D printer inclined person could make one that could house one of the cheap cutters."

Enter Kyle Plunkett, a chemistry professor at Southern Illinois University who has a 3-D printer in his office and a thin-layer chromatography plate cutter in his lab. "I thought it would be relatively straightforward to do," he tells Newscripts. "The design is basically just some blocks that are built on top of each other."

If you're unfamiliar with thin-layer chromatography (lovingly shortened to TLC), it's a technique chemists use to follow the progress of chemical reactions and separations. It involves placing spots of chemicals onto the bottom of a TLC plate—usually a piece of glass coated in silica. The base of the plate is then placed in a solvent, which travels up the plate by capillary action, carrying the chemical spots with it. The spots will move along the plate at different rates depending on their properties. Using ultraviolet light or a stain, researchers can visualize the spots and compare the starting material with the product of a reaction.

TLC plates are pricey—about \$5 for a 400 cm² plate—so chemists typically slice those into smaller plates to save money.

"When I was in grad school, we just cut it by hand with metal ruler," Jasti tweeted. But that technique can be tough to master and can produce aesthetically unpleasant, nonuniform plates at best and shattered plates at worst. That's where the expensive cutter comes in.

To make the 3-D printed version, Plunkett cribbed the design from his existing cutter. His version cost about \$5 in printer plastic, and he bought the part that does the actual cutting from Amazon for about \$20. The cutter worked well, so he posted **instructions** for making it on Thingiverse, an online 3-D printing community. The plans have been downloaded nearly 200 times. Plunkett says anyone who has used the design and wants to thank him can buy him a beer at the next American Chemical Society national meeting.

Jasti tells Newscripts that his lab hasn't made a 3-D printed TLC plate cutter yet. Nevertheless, the design "was a simple yet powerful demonstration of how useful 3-D printing can be," he says, and "also a good example of the usefulness of Twitter."



Credit: Twitter/Kyle Plunkett

A cut above: Tweets inspired Kyle Plunkett to create this thin-layer chromatography plate cutter.

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