

RECYCLING

► Polyurethane foam gets recycled

Polyurethane films and foams are typically landfilled or “downcycled” into carpet padding. That might change: researchers

have shown that they can re-form polyurethane for use in new products of similar commercial value to the original (*ACS Cent. Sci.*, 2020, DOI: 10.1021/acscentsci.0c00083).

Polyurethane is typically formed in an irreversible reaction catalyzed by dibutyltin dilaurate, which crosslinks the polymer chains when heated. The researchers found that adding more catalyst causes the

reaction to go in both directions when the temperature is raised, allowing the polyurethane to be remolded, says Daylan Sheppard, a graduate student in William Dichtel’s lab at Northwestern University and lead author of the paper. The reverse reaction breaks only a few of the crosslinks at a time, so the material never



Polyurethane foam can be reprocessed into a plastic film.

fully breaks down, Dichtel says. The team used a pair of turning screws to force out the excess air from foams as they extruded new filaments or films. The

method worked on actual consumer products, even those containing additives like flame retardants, a significant finding for real-world use, says Steven Zimmerman, a chemist at the University of Illinois at Ur-

bana-Champaign. He’s also impressed that the method works with foams, which are more challenging to recycle and represent two-thirds of commercial polyurethane products. In future work the team will work on producing foam as well as films from the recycled polyurethane.—NEIL SAVAGE, special to C&EN