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CATALYSIS MADE PLASTICS. CAN CATALYSIS UNMAKE THEM TOO?

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17 March 2024

PAPER: 3988102

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Production of industrial polymers is impossible without catalysis. In many cases, catalysts exert exquisite control over formation of molecular architecture and composition, yielding polymers with remarkable properties. Some applications release polymers into the environment both through unintended loss and through use profiles that create release. We must find solutions that eliminate persistent plastic in the environment. Desire to make plastics reusable faces many challenges. Polymers tend to degrade in processing, have the potential to carry contaminants through physical recycling, and improved physical properties of virgin polymers loom large, making infinite recycling of polymer problematic. “Chemical recycling” even wrinkles faces with confusion at an ACS meeting. “Monomerization” is actually already a word describing what we want to do; controlled decomposition of polymers to form monomers. Returning polymer to monomers is appealing, but technically difficult. Catalysis will surely be part of the solution as we are asked to use less, recycle more and to make those polymers that are released to the environment more degradable. We are entering a new era where catalysis is being asked to undo, to disassemble what it assembled. Creative solutions and new approaches are needed, turning waste into opportunity.