

# Random Copolymers Accelerate Enzymatic Plastic Recycling

## Scientific Achievement

Simulations and experiments demonstrate that random copolymers can help stabilize an enzyme known as PETase which catalyzes the degradation of the common plastic, PET.

## Significance and Impact

Plastic degradation and other important catalytic reactions can be performed by enzymes, however, they often fail in non-biological conditions. Here we show the addition of random copolymers helps to stabilize the enzyme.

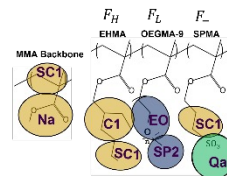
## Research Details

- An enzyme known as PETase degrades PET, but at industrially relevant conditions the structure of the enzyme is lost and it becomes inactive
- Simulations show how random copolymers bind the enzyme in a specific way which can be controlled through the composition of the copolymer
- This stabilizes PETase against increased temperature
- Experiments show an increase in the degradation of PET films and small, PET-like molecules at elevated temperature in the presence of random copolymers

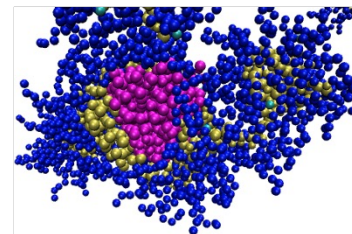
PETase Enzyme  
and Active Site



Random  
Copolymers



PETase-Random Copolymer Complex



The enzyme PETase forms nanoscale aggregates with random copolymers. In this form the enzyme is more resistant to elevated temperature.

Waltmann, C., Mills, C.E., Wang, J. et al.  
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Work was performed at Northwestern University



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