ADVANCING THE RECYCLING OF CO_2-BASED POLYMERS

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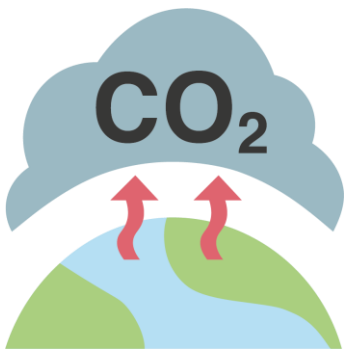
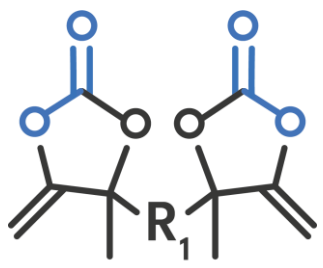
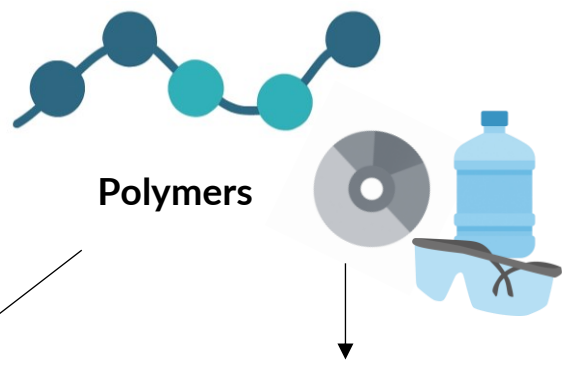




BisαCC

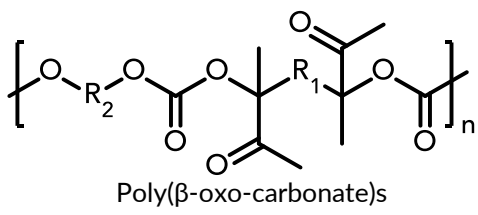


Polymers

- ✓ Basic conditions → cheap KOH
- ✓ Selectivity → no by-products
- ✓ Easy product recovery via extraction

Trash

HYDROLYSIS

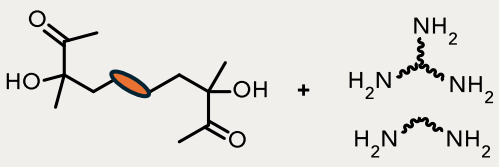


Poly(β-oxo-carbonate)s

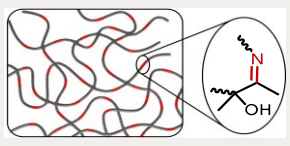
Diol

Bishydroxyketone

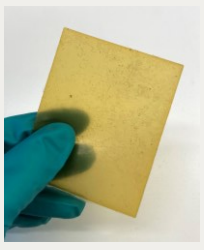
HYDROLYTIC PRODUCTS UPCYCLING INTO CANs

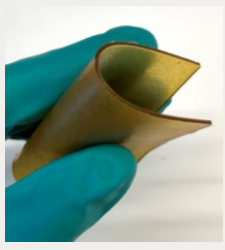


- ✓ SOLVENT-FREE FORMULATION
- ✓ NO CATALYST



Ketimine Network

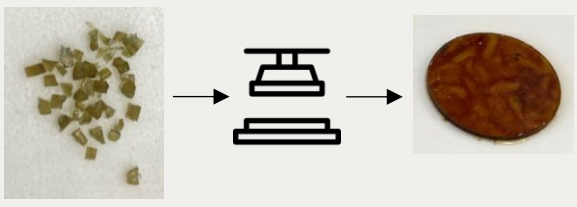




- ✓ $T_{deg\ 5\%}$ ~ 260°C
- ✓ Low Tg → FLEXIBILITY
- ✓ ELASTIC MATERIALS

Wide scope of commercial di/tri amines

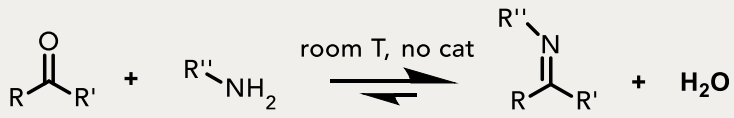
REPROCESSING OF RECYCLABLE NETWORKS



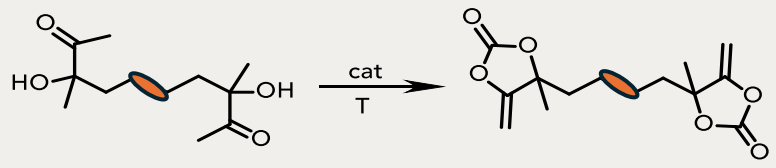
Hot Press for 30min at 80°C

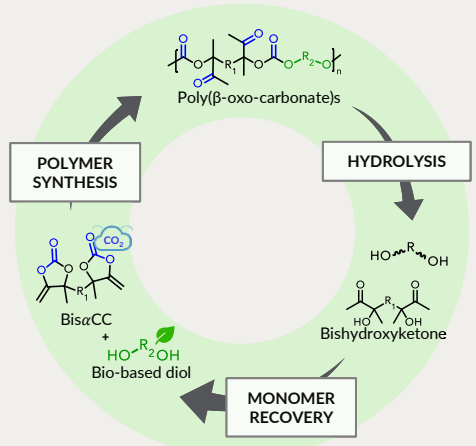
Retains flexibility & mechanical properties

Unlike conventional thermosets with irreversible cross-links, **Covalent Adaptable Networks (CANs)** can be reprocessed like thermoplastics thanks to reversible bonds in their network.



RECYCLING BACK TO THE MONOMERS



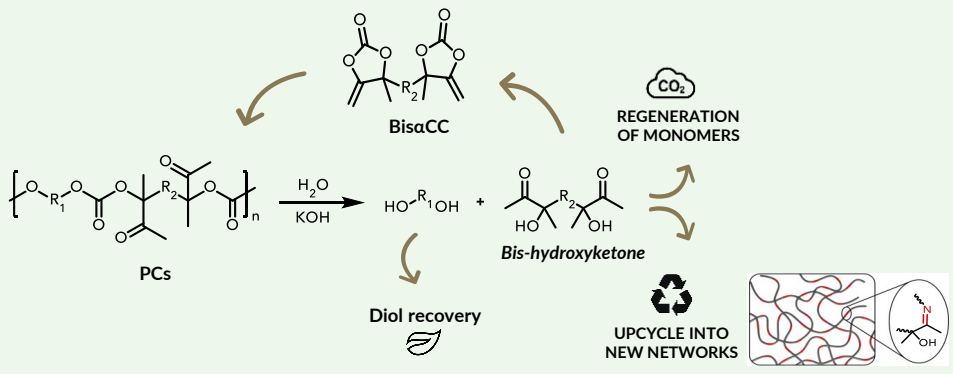


Bis-hydroxyketone carbonylation

- Non-nucleophilic organocatalysts
- Additives for directing selectivity
- > 90% yields
- Regeneration of starting polymers with same properties

CONCLUSION

- ✓ Mild depolymerization conditions
- ✓ High selectivity and recovery yields (>90%)
- ✓ Various upcycling possibilities



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References