

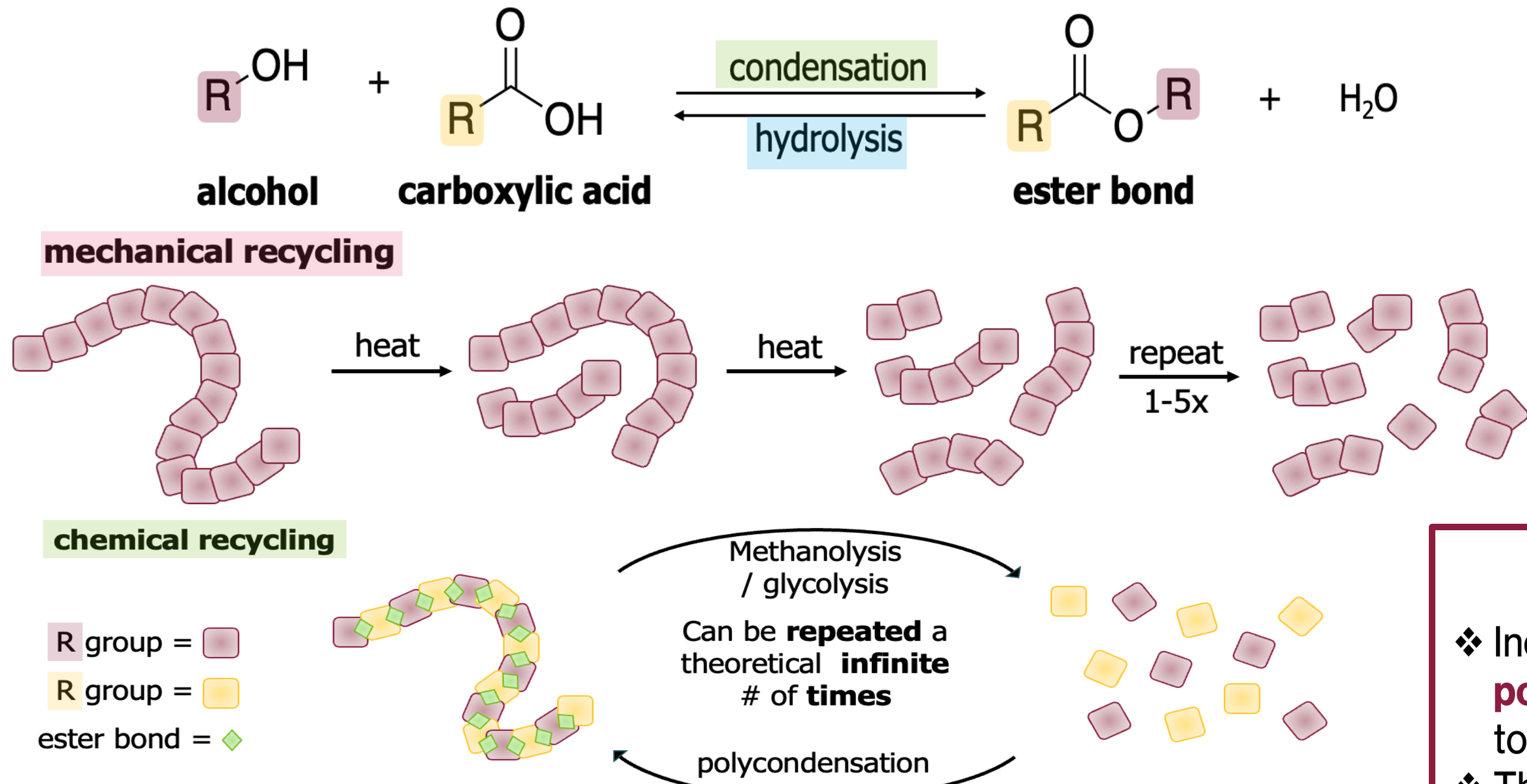
Synthesis of Novel Depolymerizable Supramolecular Polyethylene

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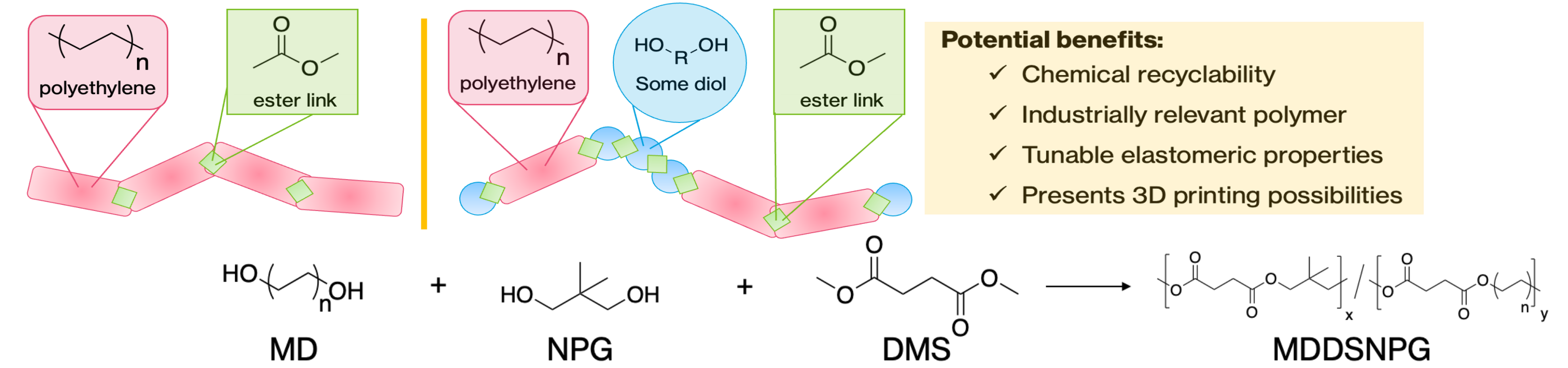
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Polyesters as an Industrially Relevant Chemical Recycling Platform



Integration of Ester Groups into Polyethylene to Incorporate Chemical Recycling Sites



25 wt. %	:	75 wt. %	→	25-MDDMSNPG
75 wt. %	:	25 wt. %	→	75-MDDMSNPG
90 wt. %	:	10 wt. %	→	90-MDDMSNPG

Conclusions

- ❖ Incorporating **polyesters** into **polyethylene** allows the material to be **chemically recycled**
- ❖ The addition of **polyester segments** into the **linear polyethylene chain** creates superior **mechanical properties**
- ❖ Potential **tunability of copolymer properties** through diol choice

Synthesis Pathway for polyethylene-polyester copolymers

1:1-MDDMS → **25-MDDMSNPG** → **75-MDDMSNPG** → **90-MDDMSNPG**

1. 170 °C for 2h N₂
 2. 220 °C for 2h N₂
 3. 235 °C for 2h vac
 4. 250 °C for 1h vac
 60ppm Ti(iPrO)₄

1. 1 ton 5 min.
 2. 6 tons 5 min.
 150 °C

Characterization and Mechanical Testing of Copolymers

Copolymer's wt. % MD	Young's Modulus (MPa)	% Strain at Break (%)
25	396	3.9
50	982	51
75	1082	520

