Greener Synthesis of Lexan

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CHEM 483

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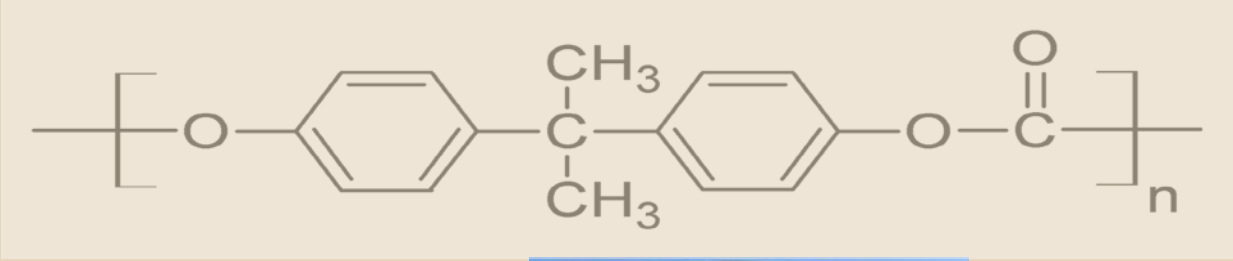
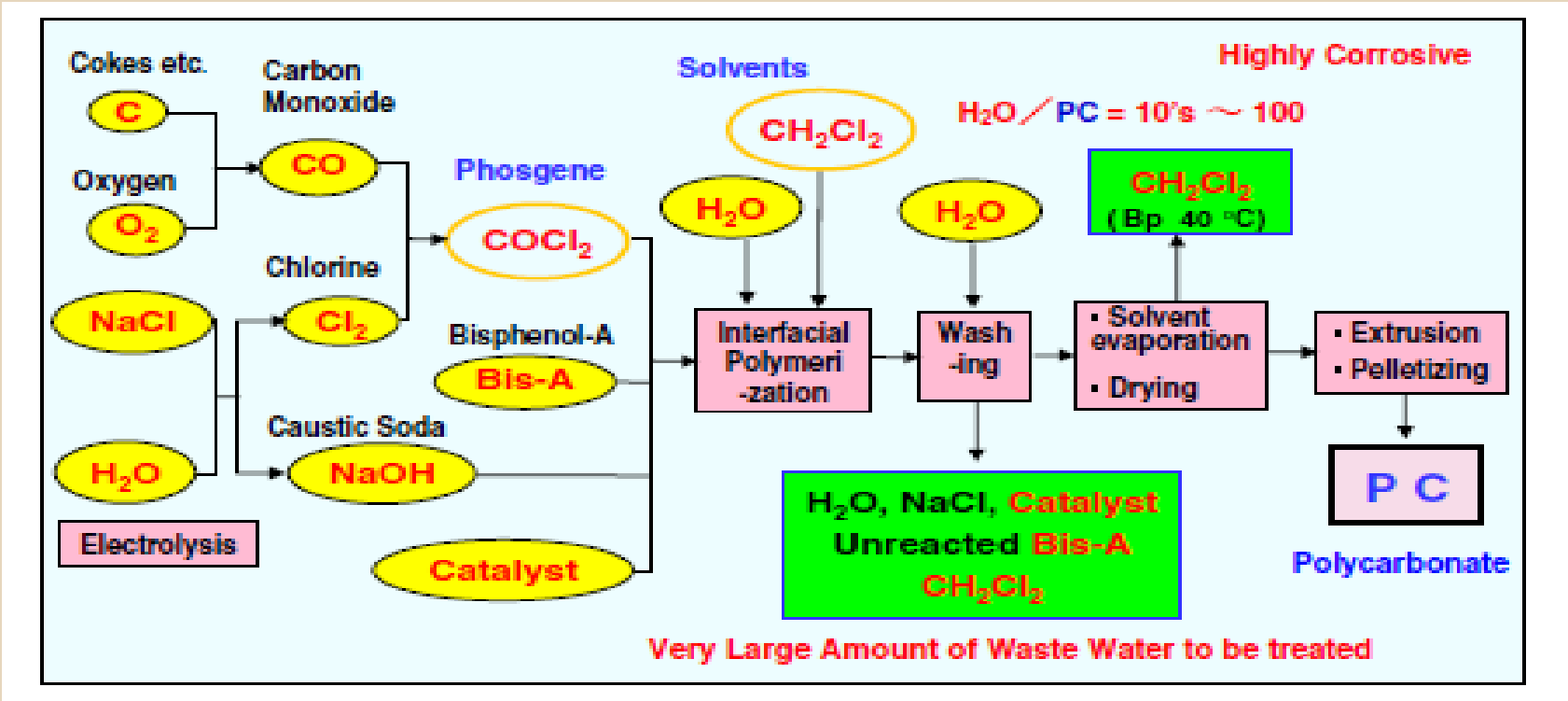
Polycarbonate- Properties and Applications



Conventional Phosgene Process



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Drawbacks of Phosgene Process

- Phosgene and Methylene Chloride Use
- Waste Water
- Corrosion of Equipment
- Chlorine and Sodium Hydroxide production create higher cost
- Chlorine impurities in product affect properties of product (heat resistance)

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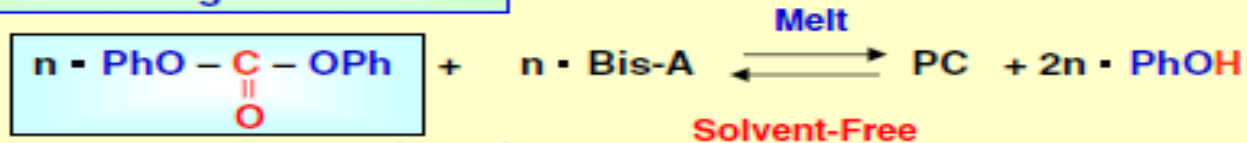
Transesterification Process

Non- Phosgene Process



Diphenyl Carbonate (DPC)

1. Difficulties in DPC Production

(1) **Ultra High Purity** : Cl< 1 ppb, Metals (Fe, Na, Ti, Co, •••) < 10 ppb

(2) **Low Cost** : Productivity, Yield & Selectivity must be High

2. Difficulties in Melt Polymerization (Never Discoloration !!)

PhOH must be removed from **Ultra High Viscous PC**

(1) Need for High Temp. & Vacuum : > 300℃, < 1 mmHg

(2) Need for reactor : **Effective Surface Renewal** of high viscous material

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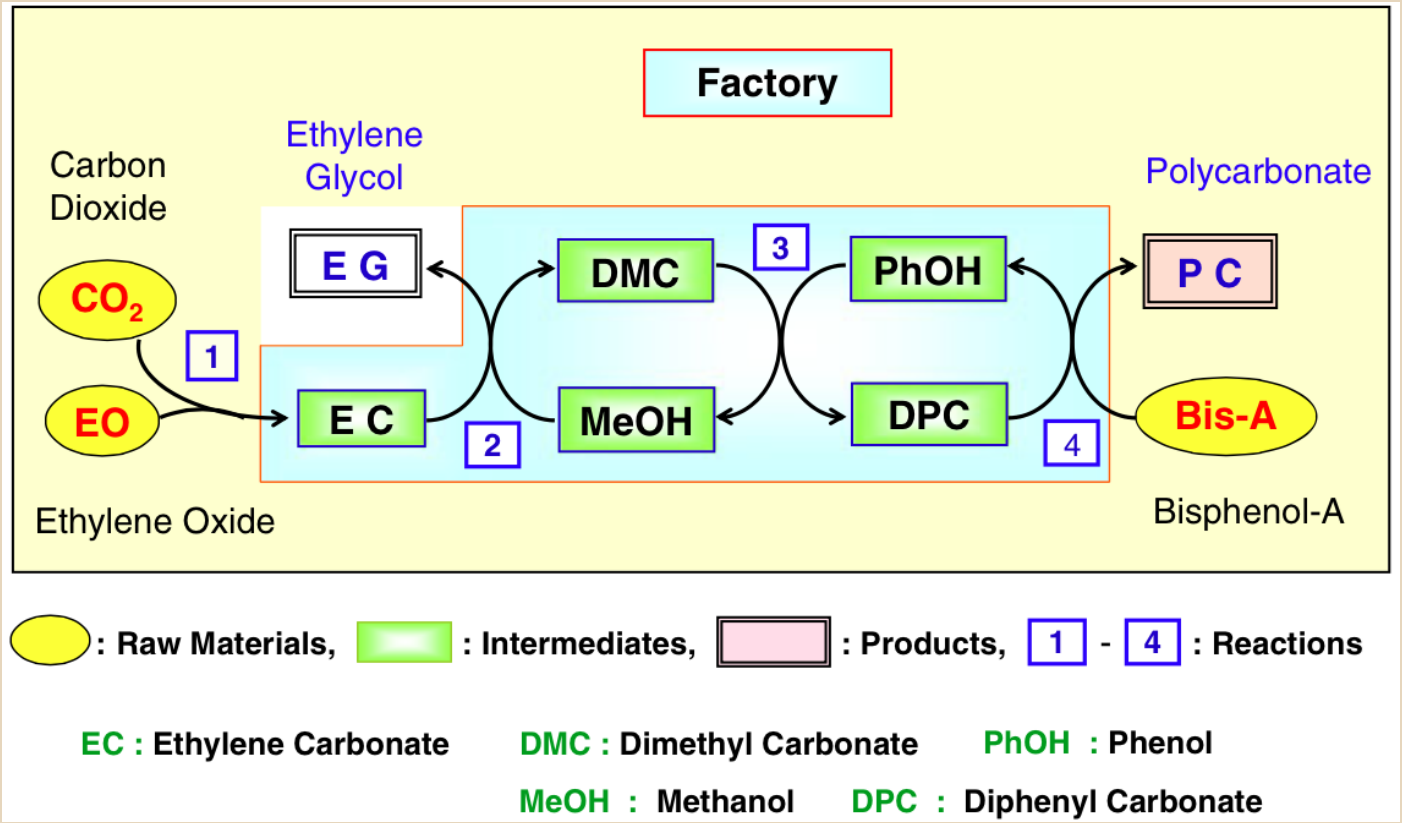
Lexan Production from CO2



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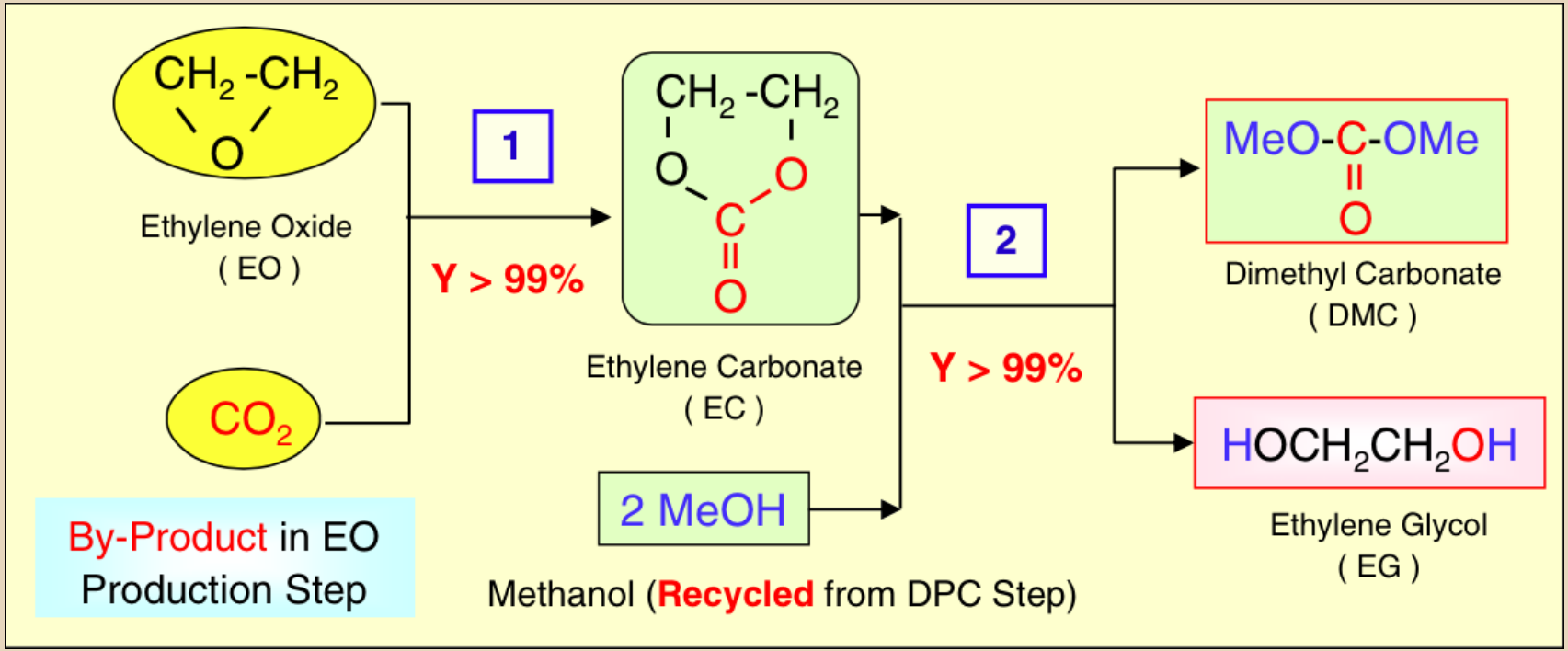
Dimethyl Carbonate (DMC) and Ethylene Glycol (EG) Production Step



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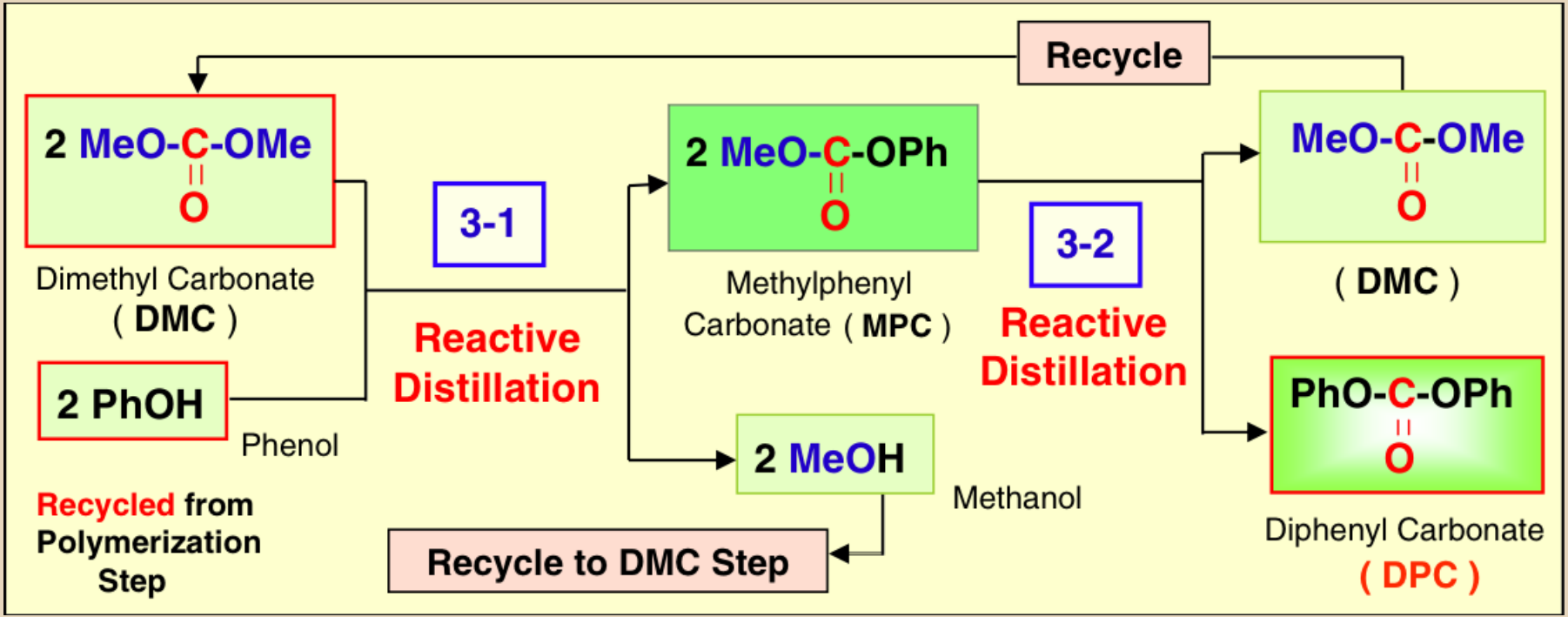
Diphenyl Carbonate (DPC) Production Step



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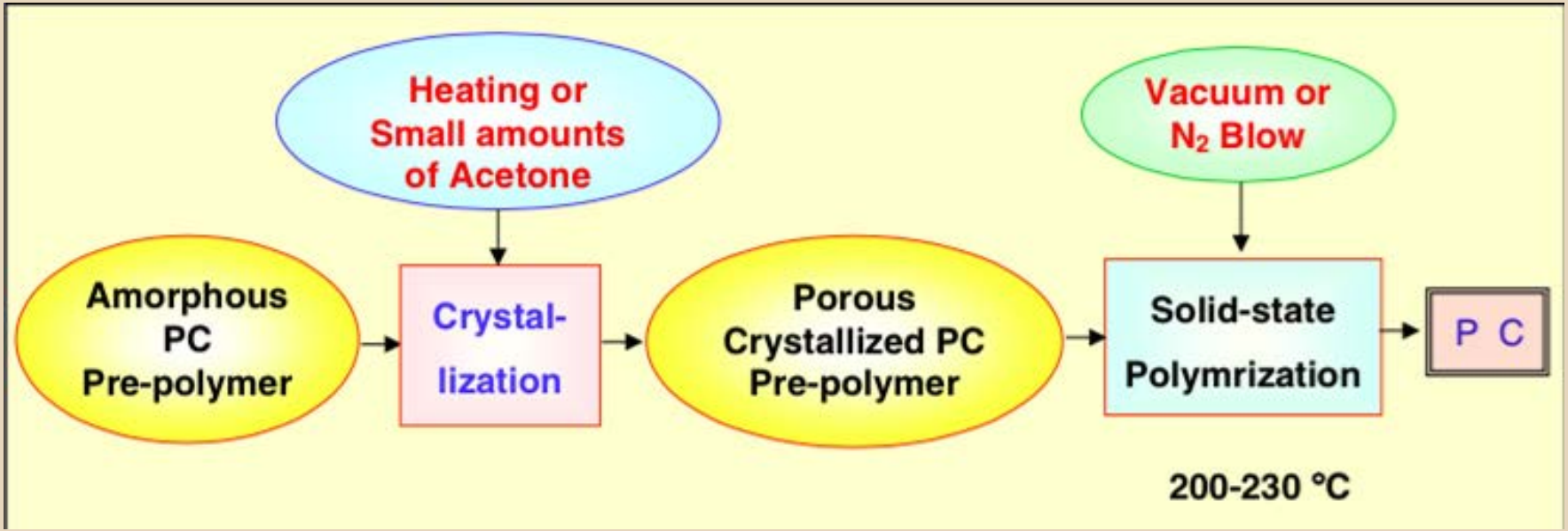
Solid-State Polymerization of PC



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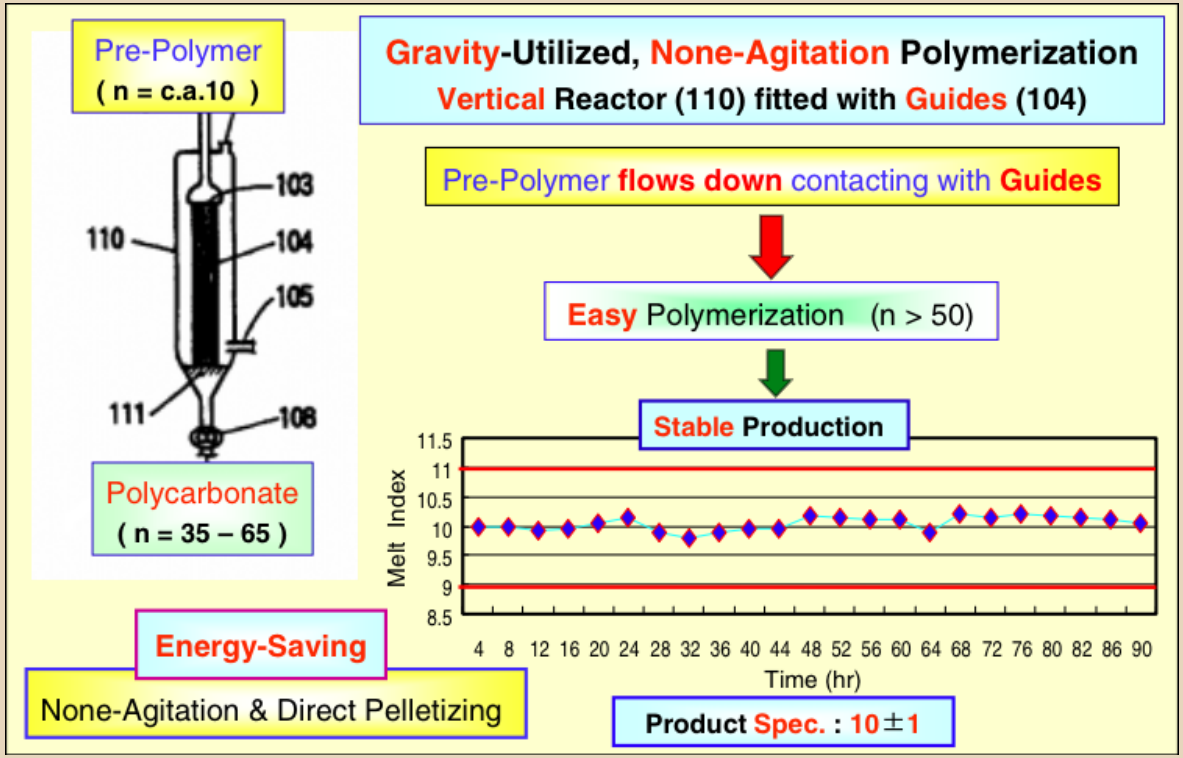
Gravity-Utilized, Non-Agitation Polymerization



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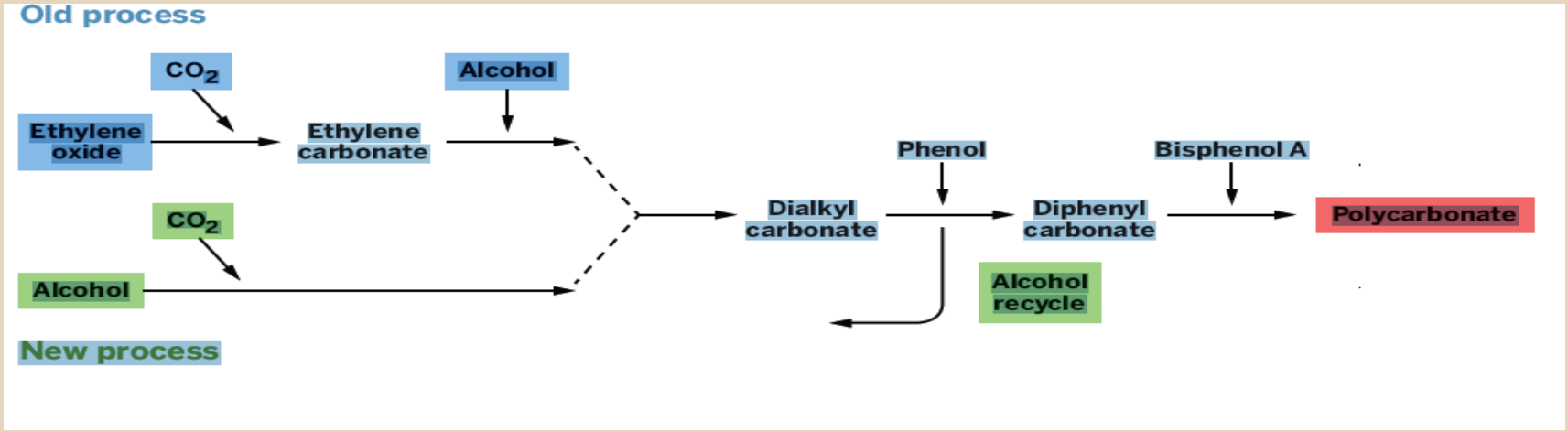
A Greener Way to Lexan



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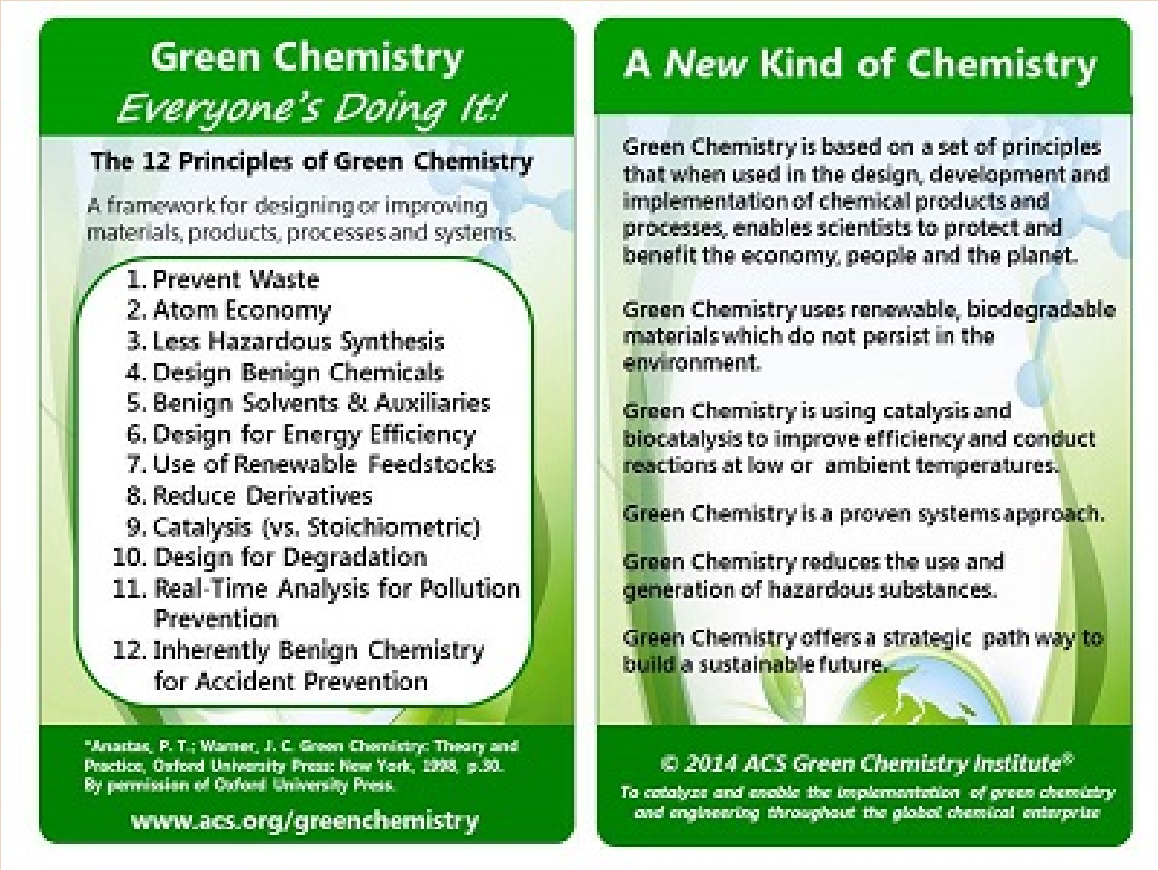

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