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Synthesis and Uses of Polycarbonate

Hai Bui
Parkland College

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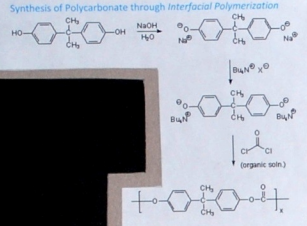
INTERFACIAL PROCESS

Synthesis of Polycarbonate through *Interfacial Polymerization*



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Interfacial Process

- Kinetically controlled reaction
- Molecular weight via chainstopper
- Amine catalysis in solvent
- Low temperature
- Washing and isolation is necessary
- High molecular weight
- Few side reactions
- Requires phosgene and solvent

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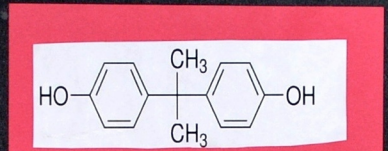
Conclusion

Polycarbonate is a very versatile material that can be used in many applications. It is used to make eyeglass lenses, water bottles, light fixtures, and windows. There are two main ways that polycarbonates are being synthesized commercially, interfacial and melt transeterification. Both processes synthesized polycarbonate from bisphenol A but both are very different. The interfacial process uses an amine catalyst, requires phosgene gas, and is kinetically controlled. The melt transeterification process uses a base catalyst, requires diphenyl carbonate, and is thermodynamically controlled. The interfacial process is generally used to synthesize polycarbonates that are used in bigger applications such as windows. The melt transeterification process is used to create polycarbonates that are light and used in eyeglass lenses.

Hai Bui
Chem 205
Parkland College
2400 West Bradley Ave
Champaign, IL
61821



Biphenol A

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Uses of polycarbonate

- equipment housings
- exterior automotive components
- outdoor lighting fixtures
- nameplates and bezels
- non automotive vehicle windows
- brackets and structural parts
- medical supply components
- plastic lenses for eyeglasses

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Properties of Polycarbonate

- excellent physical properties
- excellent toughness
- very good heat resistance
- fair chemical resistance
- transparent
- moderate to high price
- fair processing

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References

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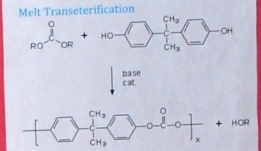
MELT TRANSETERIFICATION

Melt Transeterification



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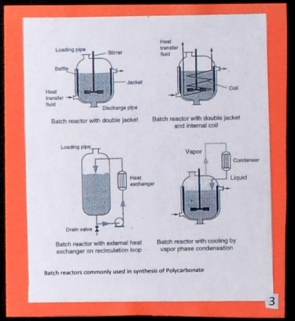

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Melt Process

- Thermodynamic control
- Molecular weight via extent of reaction
- Base catalysis of condensation
- High temperature
- Direct isolation via extrusion
- Low molecular weight
- Side reaction may occur at high temperature
- Requires diphenyl carbonate and basic catalyst
- Does not require phosgene

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