SAMYANG
SINCE 1924

SAMYANG INNOCHEM CORPORATION

Bio-Based Materials
Isosorbide

Major Locations

Seoul (Headquarter)

Related Department :
Marketing / Sales / Planning

Daejeon (R&D Center)

Gunsan (Plant)

History

SAMYANG

2009
Established
" Samyang Innochem "

Commenced bench testing equipment operation

2011

2014
Completion of ISB Pilot Plant

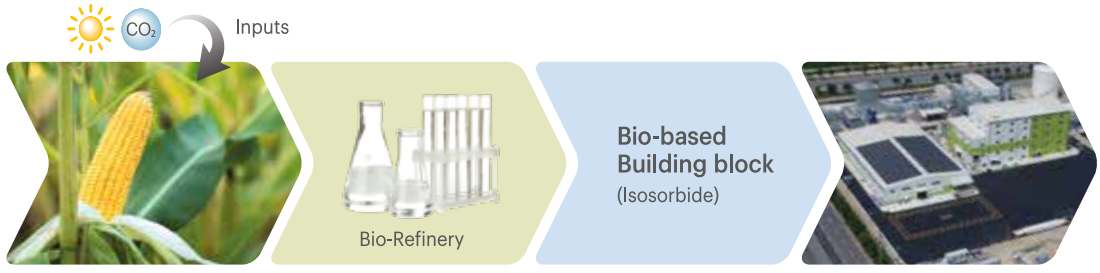
First Asia, world's second eco-friendly bioplastic material,

"Isosorbide" Successful Commercial Production

Completion of ISB Commercial Plant &Operation

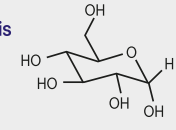
2021

Isosorbide Manufacturing Process



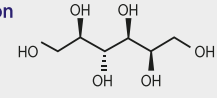
Starch

Hydrolysis



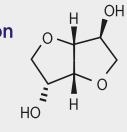
Glucose

Hydrogenation



Sorbitol

Dehydration

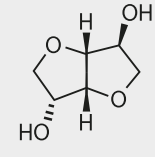


Isosorbide

Isosorbide Characteristics

• General Information

Compound name	Isosorbide
CAS number	652-67-5
Chemical formula	$C_6H_{10}O_4$
Formula weight	146.14 g/mol
Melting point	61 - 64℃
Boiling point	160℃(10mm Hg)
Solubility	Soluble in water, alcohol, dioxane ketones Almost insoluble in hydrocarbons, esters, ethers



Appearance	White crystalline flake
Water content	< 1.0%
Purity (by GC)	≥ 99.5%
pH	≥ pH 6

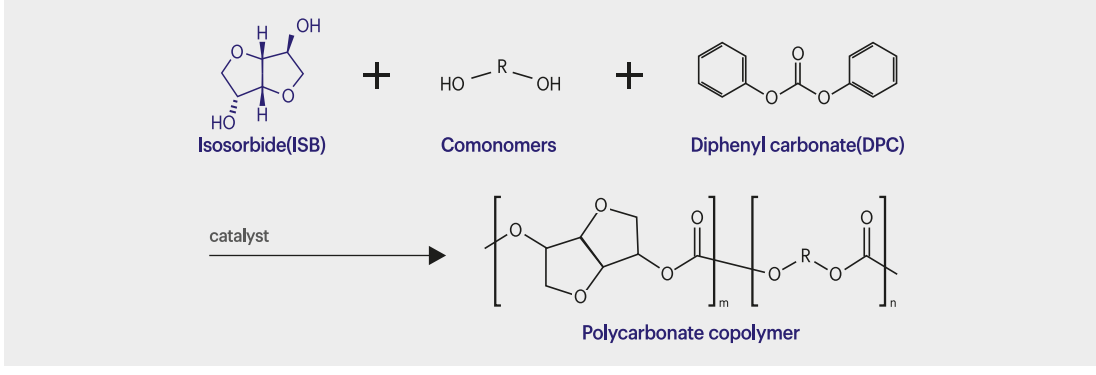
Bio-based Polycarbonate

: With high bio-content, it is environmentally friendly as it is BPA free.

: Improved optical properties compared to BPA based polycarbonate
(Low birefringence, High transmittance)

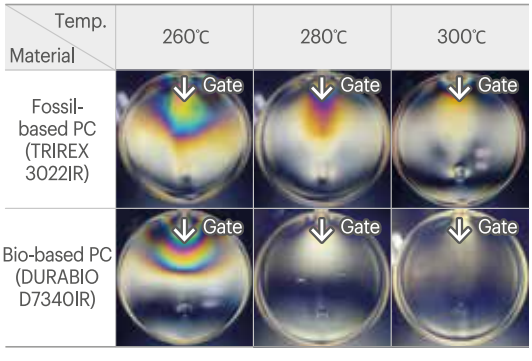
: Excellent chemical resistance, weather resistance and scratch resistance.

: Processibility is good, cause of good flow property.

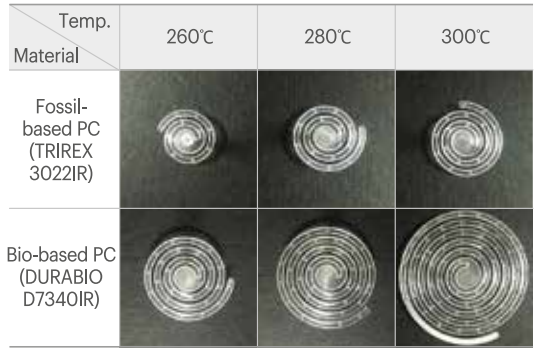


• Characteristics

< Comparison : BPA-based PC vs. ISB-based PC >



Birefringence



Flow

※ *Reference : Macromol. Res., 25(11), 1135-1144(2017)*

• Applications

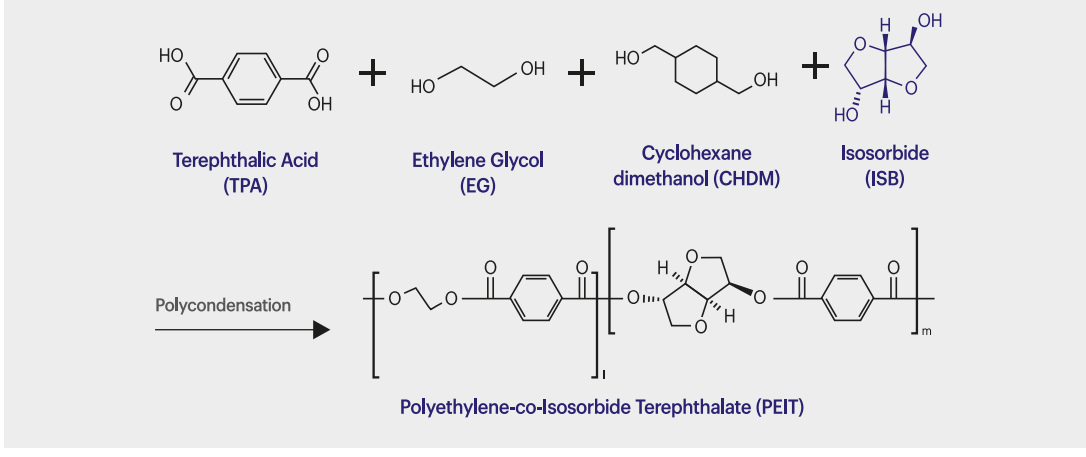
Panel/Sheet, Optical Film

Automotive Interior parts

Automotive Exterior parts

Bio-based Polyester

: Isosorbide-based PEIT* has superior heat resistance compared to conventional PET.
: (PEIT) Excellent optical properties, chemical resistance and scratch resistance.
: (Powder coating) Can be applied as high hardness or UV resin.
: (Biodegradable polyester) Improved biodegradability and tensile property.



• Applications

Heat-resistant Food container | Food storage | Powder coating resin

Cosmetic container | Biodegradable Polyester Products

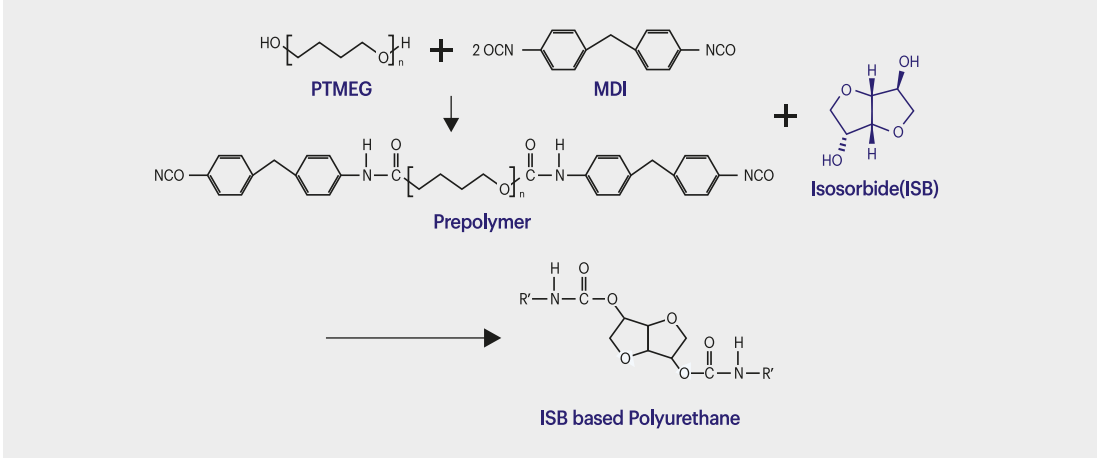
*PEIT : Polyethylene-co-Isosorbide Terephthalate

Bio-based Polyurethane

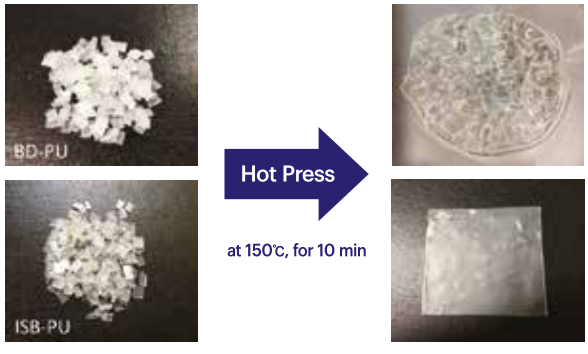
: Isosorbide can be used as a bio-based polyol, isocyanate, and additive.

: Isosorbide-based polyurethane can be developed into eco-friendly polyurethane foam, thermoplastic polyurethane, coatings, and adhesives.

: Specialty polyurethane with Isosorbide can be applied for various industrial purposes such as automotive, electric & electronics, and so on.

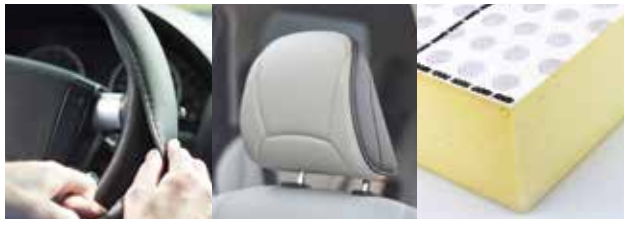


• Characteristics



Yellowing improvement

• Applications



Foam (Automotive Interior parts, Insulation)

Coatings

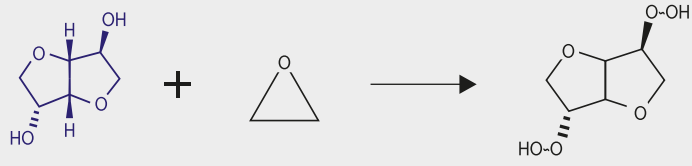
Adhesives

Isosorbide Derivatives : Bio-Polyols, DA, DMI, Epoxy, Plasticizer

Bio-Polyols (Isosorbide EI/PI)

: Ethylene oxide and propylene oxide are added to the Isosorbide.

: Can be used as a monomer or additive for polyester elastomer, polyurethane and biodegradable polymer.

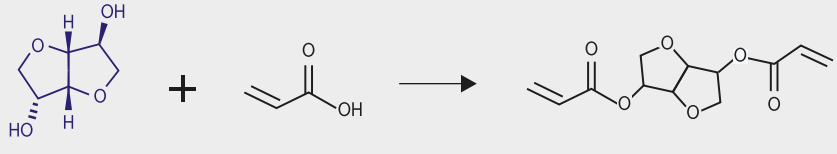


Isosorbide (ISB) | Ethlyene Oxide (EO) | Ethoxylated Isosorbide (EI)

Isosorbide Acrylate (ISB-DA)

: Acrylate is added to the Isosorbide.

: Can be used as a monomer or additive for UV hardener and diluent.



Isosorbide (ISB) | Acrylic acid | Isosorbide Diacrylate (ISB-DA)

Others : Bio-Solvent (DMI*), Epoxy, Plasticizer

: (Bio-solvent) Can be used as a raw material or additive for cosmetics and personal care products. It has good miscibility with organic solvents or water, and excellent acid-base stability.

: In addition, it can be used as Isosorbide derivative such as eco-friendly epoxy (BPA Free) and eco-friendly plasticizer (Non-phthalate).

• Applications

Cosmetics&Personal care products

Eco-friendly Epoxy

Eco-friendly Plasticizer

*DMI : Dimethyl Isosorbide

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Website
www.samyanginnochem.com