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Technical Bulletin

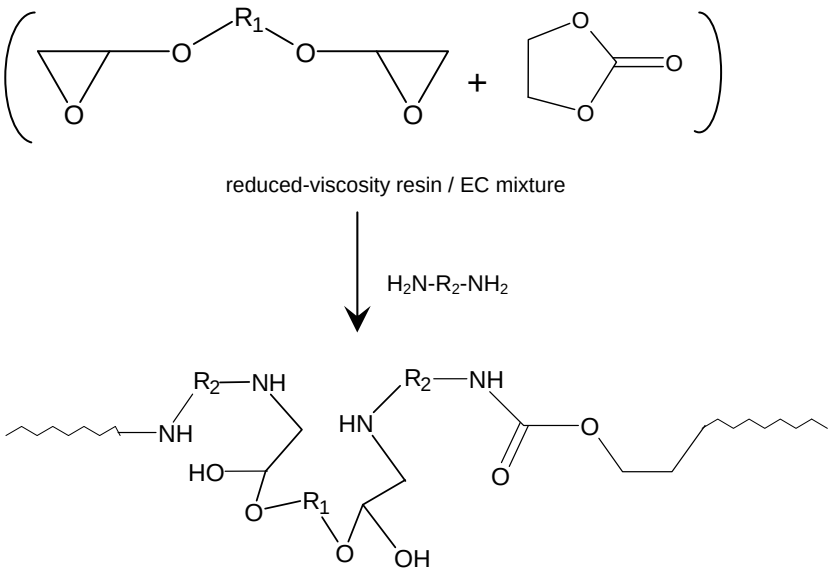
JEFFSOL® ALKYLENE CARBONATES AS REACTIVE DILUENTS

JEFFSOL® Alkylene Carbonates find utility in a number of applications as "Reactive Diluents." The term reactive diluent in this context refers to a solvent or diluent, which acts both as a viscosity reducer or solvent, and as a reactive species within a chemical system.

JEFFSOL® Alkylene Carbonates are used in both epoxy systems and in urethane systems.

EPOXY SYSTEMS

In an epoxy system, the carbonate reduces the viscosity of the epoxy resin which renders it much easier to handle and acts as a scavenger for active hydrogen containing impurities such as alcohols, amines, carboxylic acids and water. Studies have also shown that carbonates do not drastically change the room temperature characteristics of the epoxy, but it does lower the glass transition temperature (T_g). Alkylene carbonates also may accelerate the cure of epoxy systems resulting in shorter gel times, improved cured resin properties and greater elongation. The reaction below illustrates the curing of an epoxy system containing an alkylene carbonate (Ethylene Carbonate, EC) as a reactive diluent.



URETHANE SYSTEMS

JEFFSOL® Alkylene Carbonates can also be used as reactive diluents in urethane systems. Alkylene carbonates are used as a viscosity reducer in the isocyanate side. The carbonate does not react with the isocyante and reduces the viscosity enough to enhance mold fill and make the overall system easier to handle. References in the literature also claim smaller cell sizes and a more uniform dispersion of cell sizes. Patent literature also discusses the use of alkylene carbonates in polyurea systems; the carbonate is used as a reactive diluent for the isocyanate and acts as a compatibilizer between the two components, thus resulting in a better mix between the A and B components.

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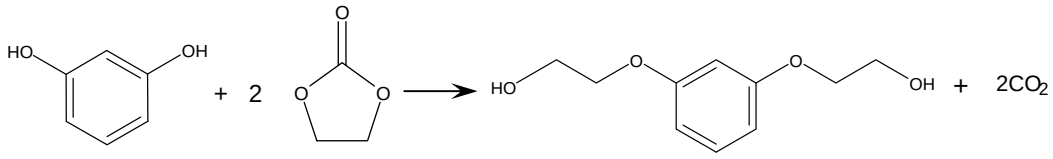
OTHER APPLICATIONS

JEFFSOL® Alkylene Carbonates may also be used as reactive diluents in other applications normally considered to be purely reactive applications. These applications include, but are not limited to, the alkoxylation or transesterification of solid or viscous materials, such as resorcinol. The reaction below illustrates the reaction of resorcinol with JEFFSOL® Ethylene Carbonate to form the bishydroxyethyl derivative of resorcinol.



In this reaction, the JEFFSOL® Ethylene Carbonate acts initially as a solvent for the resorcinol (reducing viscosity). Then during the reaction, the JEFFSOL® Ethylene Carbonate acts as a reactant combining with resorcinol to form the bishydroxyethyl resorcinol product.

For more information regarding the use of JEFFSOL® Alkylene Carbonates in alkoxylation or transesterification please refer to Huntsman's Technical Bulletins entitled "JEFFSOL® Alkylene Carbonates in Alkoxylation Chemistry" and "JEFFSOL® Alkylene Carbonates in Transesterification Chemistry." References to patent documents herein are provided as background information only, and should not be construed as a suggestion to make, use or sell any invention claimed therein without authorization from the patent owner.

References

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