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## GREEN CHEMISTRY, BIOBASED AND NON-TOXIC MATERIALS



Green chemistry is a fundamental aspect of SPECIFIC POLYMERS work and many projects are ongoing to find innovative alternatives to fossil resources from the biomass. SPECIFIC POLYMERS research effort is mainly dedicated to the development of biobased alternatives to Bisphenol-A or formophenolic based resins as well as new cyclocarbonate building-blocks for isocyanate-free polyurethane resins. This Newsletter focus on SPECIFIC POLYMERS activities regarding **biobased epoxy building-blocks as possible sustainable alternatives to BPA in green epoxy resins.**

### BIOBASED ALTERNATIVES TO BISPHENOL-A RESINS

SPECIFIC POLYMERS develops the synthesis of various lignin derivatives and special interest was given to **Vanillin DiGlycidyl Ether** prepared from vanillyl alcohol since it appears as a very promising **non-toxic and biobased substituent to DGEBA in epoxy resin formulations.** Vanillin was shown to be a promising building block for the synthesis of various biobased chemicals for polymer chemistry. It can be extracted from lignin and chemically modified in a wide range of monomers that can be used to

**SPECIFIC POLYMERS ENHANCING LAB-SCALE PRODUCTION OF NON-TOXIC AND BIOBASED ALTERNATIVE TO BISPHENOL-A RESINS**

**DGEBA : Vanillin DiGlycidyl Ether**  
SPECIFIC POLYMERS develops the synthesis of various vanillin derivatives, special interest was given to Vanillin diglycidyl ether prepared from vanillyl alcohol since it appears as a very promising non-toxic and biobased substituent to DGEBA in epoxy resin formulations. Combined with isophorone diisocyanate (IPDI), Vanillin bis epoxy allow preparing epoxy resins with a Tg of 160°C.

**SP-99-5-DGEA : Vanillin Bis epoxy**  
According to SPECIFIC POLYMERS industrial customers, this reference allow preparing a large variety of soft to tough resins in paint and coating applications. Up to now, Vanillin DGEA appears as the most promising candidate to substitute DGEBA at the industrial scale.

**Bisphenol-A (BPA) ban in consumer products**  
Known as BPA for short, Bisphenol A is a synthetic substance that has been found to cause severe diseases with genetic defect, obesity, endometrial hyperplasia, miscarriage, osteoarthritis, elevated cholesterol and polycystic ovarian syndrome. These major concerns about potential negative health effects from exposure to BPA have led to strict regulations. In France, BPA has been banned from all food plastic starting from 1st January 2015. BPA is the building block of polycarbonate plastic. It is also used for the synthesis of diglycidyl ether of BPA (DGEBA), which serves as a hardening agent in the manufacture of epoxy resins found in many common consumer products. Examples: the food and beverage, medical and dental devices, paints, ...

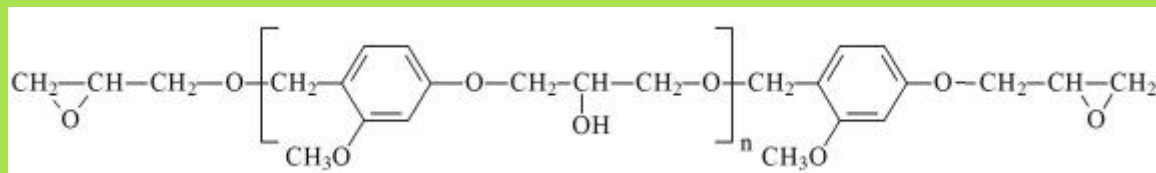
**Vanillin : Biobased building block**  
Vanillin has been shown to be a promising biobased building block for the synthesis of various biobased chemicals for polymer chemistry. It can be extracted from lignin (vanillin from lignin process) and chemically modified in a wide range of monomers that can be used to prepare epoxy, polyester or polyurethane based materials.

**Find if SPECIFIC POLYMERS appropriate monomers and polymers in our catalog.**

More Functional Monomers and polymers © SPECIFIC POLYMERS 2015. 01 20 2024 144 810 218

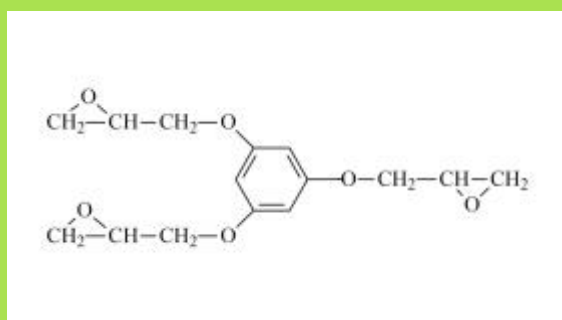
prepare epoxy but also polyester or polyurethane based materials.

### **HIGHLIGHTED BIOBASED BUILDING-BLOCKS**



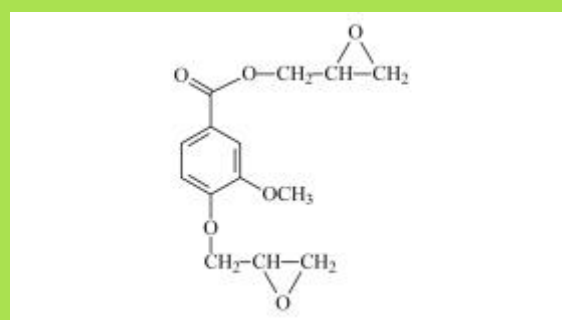
**SP-9S-5-005**

**DGEVA - Vanillin DiGlycidyl Ether**



**SP-9S-5-005**

**Phloroglucinol Tris Epoxy**



**SP-9S-5-007**

**Vanillic Acid Bis Epoxy**

**FIND ALL SPECIFIC POLYMERS BIOBASED PRODUCTS HERE**

### **BIOBASED PRODUCTS**

LOOKING FOR BIOBASED BUILDING-BLOCKS, MONOMERS OR POLYMERS FOR YOUR SPECIFIC APPLICATION ?

DO NOT HESITATE TO CONTACT US

**CONTACT US**

### **RELATED SCIENTIFIC ARTICLES**



**Epoxy thermosets from model mixtures of the lignin-to-vanillin process**  
M. Fache, et al., Green Chemistry, 2016



**Vanillin, a promising biobased building-block for monomer synthesis**  
M. Fache et al., Green Chemistry, 2014

**FIND ALL SCIENTIFIC ARTICLES RELATED TO SPECIFIC POLYMERS HERE**

## PUBLICATIONS

### ISOCYANATE-FREE POLYURETHANES MATERIALS

**CYCLOCARBONATES BUILDING-BLOCKS, MONOMERS AND POLYMERS**

**Toward isocyanate-free Polyurethane materials**

Monomers, Polymers and building-blocks containing cyclocarbonate moieties have shown to be very interesting in the synthesis of linear or crosslinked polyurethanes. Such polymer materials, also called **isocyanate-free polyurethanes**, are obtained by reaction of carbonates with amines and are very less toxic than classical polyurethanes prepared from the reaction between alcohols and isocyanates.<sup>1,2</sup>

**HIGHLIGHTED PRODUCTS**

- SP-48-001  
Cyclohexanone methacrylate
- SP-3-00-001  
TPP-TI-Cyclocarbonate
- SP-1P-0-004  
PDI-As Cyclocarbonate
- SP-3-02-002  
EPOD-17 Polycyclocarbonate Carbonate
- SP-68-007  
Cyclohexane methacrylate
- SP-68-001  
EPOD-17 Cyclohexane

**SEE CORRESPONDING NEWSLETTER HERE**

Through its research activities toward green and non-toxic materials, SPECIFIC POLYMERS develops the synthesis of a wide range of **cyclocarbonate building-blocks, monomers and polymers**. Such products enable to prepare **isocyanate-free polyurethane materials**.

**SEE CORRESPONDING NEWSLETTER HERE**



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