TECHNICAL UPDATE

CRAY VALLEY
Hydrocarbon Specialty Chemicals

Hydrogenated Polybutadiene Monols and Diols as Reactive Intermediates

Benefits

- Fully saturated olefinic backbone
- Reactive terminal hydroxyl groups
- Liquid physical form
- Highly controlled structure

Target Markets/Applications

Additional Information

Description

Cray Valley HSC offers hydrogenated Krasol® diols and monols to be used as reactive intermediates for a variety of specialized applications. Krasol polybutadiene polyol products are linear oliogmers characterized by having very narrow molecular weight distributions and quantitative terminal hydroxyl functionality. A complete hydrogenation step results in highly uniform products with no residual unsaturation while maintaining terminal functionality. When used in specialty applications, the resulting Krasol HLBH grades still impart the hydrophobic character normally associated with liquid polybutadienes, but are no longer subject to degradation over time when exposed to UV radiation and oxidative conditions.

Currently, two Krasol HLBH grades are available: Krasol® HLBH2000 and Krasol® HLBH5000M. Typical properties of these grades are provided in Table 1.

Table 1: Hydrogenated Krasol products.

Product	Type	Mn (g/mol)	PD	Viscosity (cps@25˚C)	-OH value (meq/g)
Krasol® HLBH2000	Hydrogenated Diol	2000	1.01	3,700	0.90
Krasol® HLBH5000M	Hydrogenated Monol	5000	1.01	63,700	0.20

The terminal hydroxyl group can be transformed into a number of functional groups through known reactions. Carboxylic acids, amines, isocyanates and acrylates are known to be useful derivatives in a number of applications. Figure 1 describes the step-wise reactions from hydrogenation to a number of valuable derivatives. \With the addition of amine, epoxy, acrylate, and siloxane groups, these functional olefins can participate in a number of reactive chemistries, including adhesives.
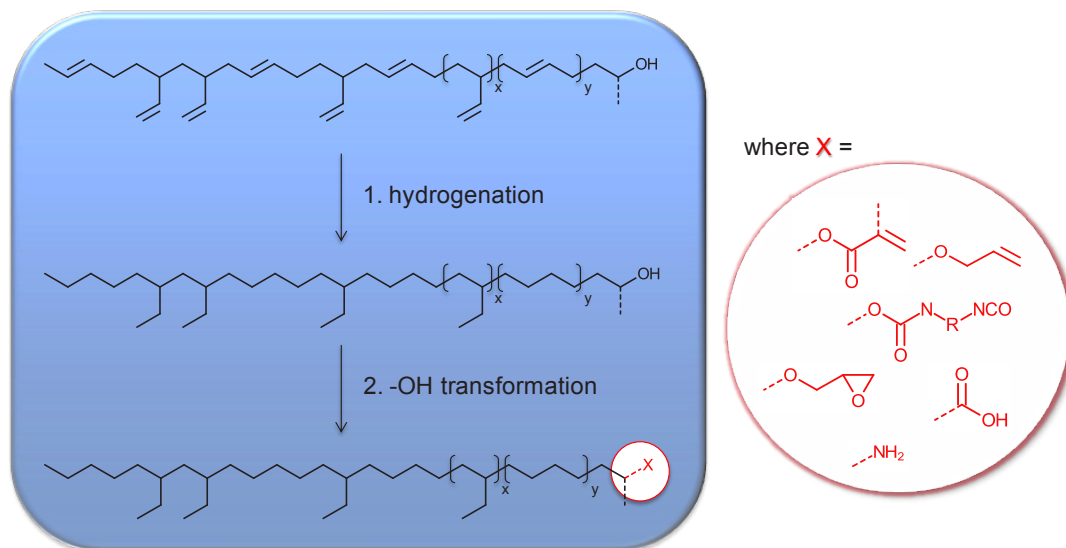

Figure 1: From polybutadiene monol to useful functional olefins.

The hydrogenated Krasol grades can be applied in a number of applications where terminally functional liquid olefins are valued. Fully saturated highly reactive monofunctional grades can be used as fuel and lubricant additives to minimize the buildup of sludge and oxidative products. Through the addition of a polymerizable group, macromonomers can be synthesized and incorporated into polymerizations of polar monomers to form long olefinic side chains (comb polymers). Such derivatives may also be useful as hydrophobic components in liquid optically clear adhesive and sealant systems. Monofunctional derivatives are also useful surface treatment agents and can be used to disperse fillers or compatibilizing aids in thermoset or thermoplastic applications (Figure 2).
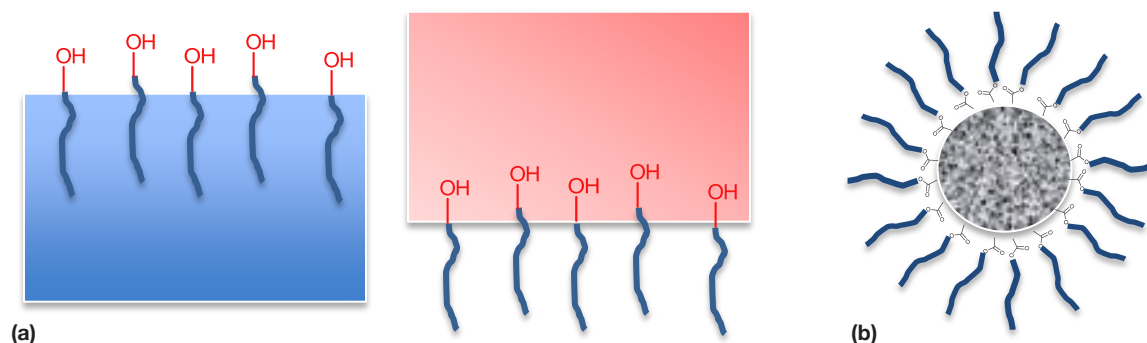

Figure 2: Monofunctional derivatives as compatibilizers (a) and surface treament agents (b).

Discussion & Conclusion

Difunctional grades can find utility in traditional urethane chemistry either as stable diol components or through simple transformation into olefinic diisocyanates. These hydroxyl-terminated olefins can be used to formulate electronic encapsulants with superior weather resistance.

Hydrogenated grades of Cray Valley HSC's Krasol product line can be useful in a variety of high-value applications. The fully saturated clear liquid products are quantitatively chain-end functional materials. The unique structures are well defined and can be derivatized into a number of reactive intermediates to meet your formulating needs.

For more information or additional details pertaining to the study, please contact:
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