



ThioSOY: Renewable Thiol Curing Agents

Airable Research Lab has developed a soy-based thiol curing agent platform that combines fast curing, strong adhesion, and flexibility that are typical of traditional thiols with the added value of renewable content and lower toxicity. Our chemistry provides a high-performance, sustainable alternative to petrochemical curing agents for epoxy, resin, and coating applications.

THE TECHNOLOGY

Airable modifies soybean oil to introduce thiol functionality, producing ThioSOY, a tunable curing agent demonstrated in epoxies, resins, and coatings. The Airable formulation provides the desirable hardness, flexibility, and optical clarity while increasing bio-based content. Formulated 1:1 equivalent with bisphenol A diglycidyl ether (BADGE, ~377 MW), the system formed a glassy coating with high durometer hardness and 5B adhesion to steel. Compared to the petroleum-derived thiol trimethylolpropane tris(3-mercaptopropionate) (TMPTMP), ThioSOY exhibited similar mechanical and adhesion performance, supporting its use as a bio-based drop-in replacement. With 4 wt% DMP-30 catalyst, the formulation provided a 64-minute pot life at 20°C, demonstrating rapid ambient cure.

APPLICATIONS

- Coatings
- Adhesives
- Sealants

BENEFITS

- Low-temperature cure
- Lower toxicity than other curative chemistries
- Excellent metal adhesion
- Good chemical resistance

| Product | Equivalent Weight (g/eq) | Gardner Color | Viscosity (cPs, 25C) | Bio Content (%) |
|---------|--------------------------|---------------|----------------------|-----------------|
| ThioSOY | ~221 | 15 | 5,500 | 65 |

| Product | Young's Modulus (MPa) | Shore D | Cross Hatch Adhesion | Pot Life |
|----------|-----------------------|---------|----------------------|----------|
| ThioSOY* | 11.18 | 80 | 5B | 64 min |
| TMPTMP* | 13.19 | 87 | 5B | N/A |

*Cured 1:1eq with BADGE (~377MW)

Airable's thiol curing agent platform provides a renewable foundation for next-generation sustainable materials. We invite partners for collaborative product development. Airable is planning to file a patent application for this technology.