

**FLEXIBLE SUCROSE-BASED EPOXIES
FOR BONDING NEEDLEPUNCHED NONWOVEN
COTTON CONTAINING COMPOSITES
TO DISSIMILAR MATERIALS**

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Abstract

When flame resistant light weight needlepunched nonwoven cellulosic fabrics are first coated with a mixture comprising epoxy allyl sucroses (3.2 epoxy groups per sucrose) and amines, then adhered to aluminum foils, or other backing materials, and cured, flexible flame resistant composites are generated. The new materials will find use as home and tent insulation, sound barriers, cushioning material, and in the development of false walls. The new cotton-sucrose-based epoxy-aluminum composites are created from four types of materials:

- Flame-resistant nonwoven cotton containing fabrics (to act as fillers, padding, sound barriers, and insulation).
- Epoxy allyl sucrose with 3.2 epoxy groups per sucrose (to crosslink cellulose, aluminum, and the amines; to provide flexibility to the cured composite; and prevent the cotton fibers from escaping the batt).
- Long chain amines and amides (to cure sucrose-based epoxies, provide more flexibility, and afford water repellency).
- Acrylic coated aluminum foils bonded to both sides of the composite fabric (to reflect heat, prevent the cotton fibers from escaping the batt, and afford water resistance).

In this paper we showed: (1) methods for preparing the sucrose-based epoxy monomers; (2) the flexibility of the cured composites; (3) the cotton containing composites; (4) methods for evaluating the thermal properties of the composites (R-value and flammability); and (5) a materials cost analysis.