

APPLICATION SHEET

Polymers – Paints & Coatings

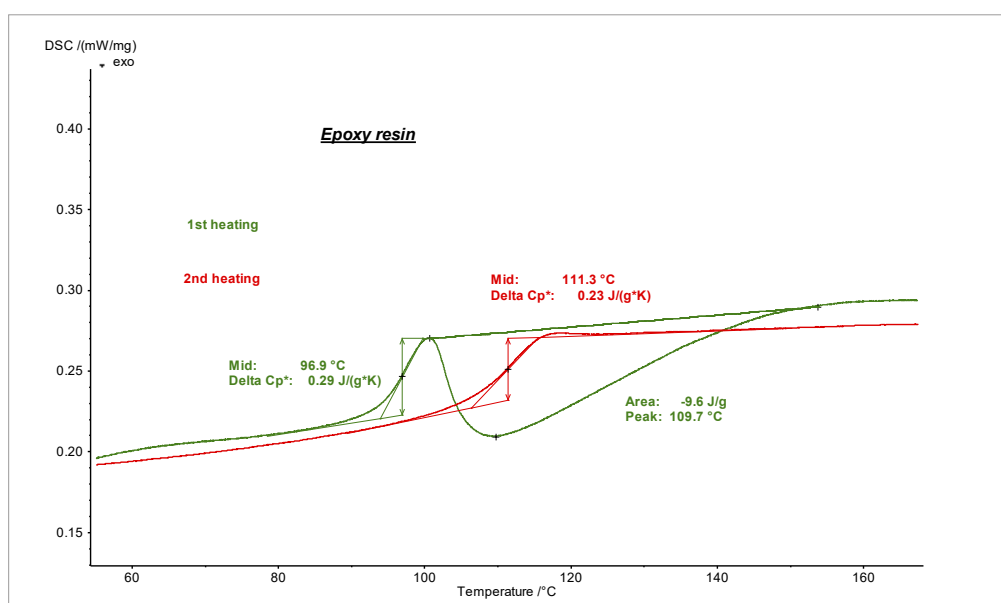
DSC

Epoxy Resin

Introduction

Epoxy or polyepoxide is a thermosetting epoxide polymer that cures (polymerizes and crosslinks) when mixed with a catalyzing agent or “hardener”. Most common epoxy resins are produced from a reaction between epichlorohydrin and bisphenol-A. The first commercial attempts to prepare resins from epichlorohydrin occurred in 1927 in the United

States. Credit for the first synthesis of bisphenol-A based epoxy resins is shared by Dr. Pierre Castan of Switzerland and Dr. S.O. Greenlee in the United States in 1936. The applications for epoxy based materials are extensive and include coatings, adhesives and composite materials such as those using carbon fiber and fiberglass reinforcements, although polyester, vinyl ester, and other thermosetting resins are also used for glass-reinforced plastics.



Test Conditions

Temperature range: 20 ... 180°C (twice)
Heating/cooling rates: 10 K/min
Atmosphere: Nitrogen (20 ml/min)
Sample mass: 10.32 mg
Crucible: Al, pierced lid

Test Results

The endothermic step detected at 97°C (midpoint) during the first heating indicates the glass transition of the powder resin before curing. The exothermic peak that follows (peak temperature at 109.7°C) results from curing of the sample. In the second heating, the glass transition was shifted to 111.3°C and the step in specific heat was smaller than in the first heating (0.23 J/(g·K) to 0.29 J/(g·K)). Both effects are due to curing of the resin.