

NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Cure of Epoxy Resins Determined by Simple Tests

A rapid visual test and a simple quantitative test have been devised to give indications of the degree of cure of particular epoxy resin binders in prepreg stock (sheets of fabric impregnated with a resin in a partially cured condition, known as the B stage). Stacked layers of the prepreg sheets are normally formed into laminates (such as for printed circuit boards) under controlled pressure, temperature, and time to ensure proper bonding between the individual prepreg sheets. If the cure of the stock prepreg material is in an advanced (overcured) stage, it will not be possible to obtain satisfactory bonding.

Visual (Qualitative) Test. Samples of the prepreg material, approximately 1 inch square, are immersed in an aqueous morpholine solution at room temperature for 5 minutes. The samples are then rinsed in clear water and inspected visually.

Normal prepreg samples (representing particular epoxy compositions) exhibited a milky white appearance: highly overcured prepreg material remained almost clear. A definite gradation of cloudiness corresponding to the degree of overcure was observed between these two extremes.

Quantitative Test. Small weighed samples of the prepreg material (representing specific epoxy compositions) are extracted with reagent grade acetone at

room temperature, air dried at the same temperature, and reweighed. The weight loss calculated on a resin content basis was found to decrease in a consistent and repeatable manner as the degree of cure increased for the particular samples evaluated.

Notes:

1. It is possible that these tests may be extended to a number of different epoxy formulations. In some cases, solvents other than acetone may be required for the quantitative test.
2. Details concerning these tests may be obtained from:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B68-10043

Patent status:

No patent action is contemplated by NASA.

Source: M. Ladaki and W. G. Nigh
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(MFS-13131 & 13132)

Category 03