Materials Engineering Branch

TIP*

No. 056 Corrosion of Copper Alloys by Polymeric Materials

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If corrosion of copper alloys, such as CuBe for example, is to be avoided then coatings, adhesives, potting compounds, etc. that utilize epoxy-amine and epoxy-amide polymer systems should be applied with precaution. Especially where it may contact the copper alloy and the metal is a thin or small diameter component such as a foil or wire.

The corrosion manifests itself as a blue to green compound that is a reaction product of copper and the amine or amide. The corrosion occurs at the junction of the metal and the polymer where there is exposure to air. If allowed to proceed, such innocuous looking corrosion may cause premature failure or degradation of mechanical and electrical properties. Such a failure was experienced on the EGRET experiment in 0.003 inch diameter wires of CuBe that were bonded under tension with an epoxy that employed an amide catalyst.

Substitution of other materials may be advisable. However, carrying out the application and curing process in a dry environment or preferably under dry nitrogen will prevent the corrosion problem. After curing, the surface at the metal/polymer interface should be cleaned with isopropyl or ethyl alcohol.