

# NASA TECH BRIEF



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## Flexible Protective Coatings Made From Silicon-Nitrogen Materials

**The problem:** To develop a protective coating that will withstand elevated temperatures for long periods while retaining its flexibility.

**The solution:** Two substances that exhibit the desired characteristics: a polymer obtained as a byproduct in the preparation of hexaphenylcyclotrisilazane; and a polymer obtained by heating bis(methylamino)-diphenylsilane.

**How it's done:** The first substance is produced by treating diphenyldichlorosilane with ammonia and evaporating the mother liquors after the crystalline hexaphenylcyclotrisilazane has been separated by filtering. The resinous byproduct forms the protective coating after curing briefly at 300°C.

The second substance is produced by heating bis(methylamino)diphenylsilane at 315° to 320°C for two hours and removing the resultant crystals by centrifugation. The remaining liquid byproduct forms the protective coating after brief heating at elevated temperatures.

### Notes:

1. Aluminum panels treated with the first coating and cured for one hour at 300°C were visibly unaffected by one hour in boiling water. Placed in a 19% hydrochloric acid solution, the coated areas were still unaffected when uncoated areas were black and deeply etched.
2. The second coating, on stainless steel, did not crack when the panel was bent repeatedly after having been heated at 500°C for an hour.

**Patent status:** Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)), to the Southern Research Institute, 2000 Ninth Avenue South, Birmingham, Alabama.

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