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New Primers for Adhesive Bonding of Aluminum Alloys

Two synthetic polypeptides, poly(L-serine) and poly(L-tyrosine), form suitable primer coatings for aluminum alloy 2014-T6 which is to be subsequently bonded with high-temperature epoxy resins (e.g., a bisphenol-A resin cured with diethylenetriamine, or a modified, filled bisphenol-A resin cured with pyromellitic anhydride). The polypeptide adhesive primers are effective, with the indicated bonding resins, at temperatures from 100° to 300° C.

Deposition of poly(L-serine) from aqueous solution, or poly(L-tyrosine) from dimethylformamide solution, provides adherent primer coatings on the prepared aluminum alloy surfaces. However, *in situ* polymerization of the N-carboxyanhydrides of L-serine or L-tyrosine on the aluminum alloy surfaces does not appear to be feasible as a method of applying the primer coatings.

Poly(L-tyrosine) deposited as a primer coating in thicknesses of up to approximately 1.3 mils increased the lap-shear failure loads (as compared to control specimens lacking a primer) of aluminum alloy specimens bonded with bisphenol-A resin cured at room temperature with diethylenetriamine. In contrast, the use of poly(L-serine) as a primer coating in conjunction with the indicated adhesive resin system did not increase the lap-shear strength. Solution-deposited poly(L-tyrosine) and poly(L-serine) both decreased the lap-shear strength of the adhesive system consisting of the modified, filled bisphenol-A resin cured with pyromellitic anhydride.

Note:

The following documentation may be obtained from:

National Technical Information Service
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.95)

Reference:
NASA CR-102846 (N70-42306), Preparation and Study of Synthetic Protein-Like Materials for High Performance Adhesive Systems

Patent status:

No patent action is contemplated by NASA.

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