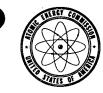
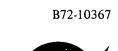
June 1972



AEC-NASA TECH BRIEF



provided by NASA Technical Reports

brought to you by 🗓 CORE



AEC-NASA Tech Briefs announce new technology derived from the research and development program of the U.S. AEC or from AEC-NASA interagency efforts. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Bondability of RTV Silicone Rubber

Cured two-part Room Temperature Vulcanizing (RTV) silicones are not bondable with common organic adhesives such as epoxies or neoprene. Attempts to develop bondable surfaces on cured RTV have primarily involved various silicate or silane primers. These have met with only marginal success.

a second s

A new glow discharge method renders the vinyl addition RTV silicone rubber surface bondable. An activated oxygen plasma acts on both sides of the RTV specimens in a glow discharge chamber for 10 minutes. The power level is set at 250 watts and the oxygen pressure at 1 millimeter mercury.

This treatment provides the RTV silicone specimens with adhesive bond strength in excess of 500 psi. In contrast, untreated specimens exhibited adhesive bond strengths of less than 10 psi.

The glow discharge treatment challenges the prevailing theory concerning the relationship between surface characteristics and bondability. According to this theory the presence of a "weak boundary layer" (WBL), related to low molecular weight polysiloxane fractions on the surface, contributed to the unbondability of silicone rubber. Therefore, most attempts to produce a bondable surface of silicone rubber were directed toward removal of the WBL.

The glow discharge treatment creates a bondable surface of silicone rubber without removing the WBL. The activated oxygen reacts preferentially with the vinyl groups rather than the ring structured polysiloxanes leaving the WBL virtually unchanged. This implies that the presence or absence of WBL or low molecular weight inclusions is a secondary or negligible factor in the bonding process, and that treatment of the polymer substrate is the primary factor.

Note:

Requests for further information may be directed

to:

Mr. Glenn K. Ellis Technology Utilization Officer Office of Information Services U.S. Atomic Energy Commission Washington, D.C. 20545 Reference: TSP72-10367

Patent status:

Inquiries concerning rights for commerical use of this information may be made to:

Mr. George H. Lee, Chief Chicago Patent Group U.S. Atomic Energy Commission Chicago Operations Office 9800 South Cass Avenue Argonne, Illinois 60439

> Source: Nicholas J. DeLollis, and Orelio Montoya Sandia Laboratories under contract to Atomic Energy Commission (AEC-10026)

> > Category 04

This document was prepared under the sponsorship of the Atomic Energy Commission and/or the National Aeronautics and Space Administration. Neither the United States Government nor any person acting on behalf of the United States Government assumes any liability resulting from the use of the information contained in this document, or warrants that the use of any information, apparatus, method, or process disclosed in this document may not infringe privately owned rights.