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MODIFICATION OF SILICONE ADHESIVES USING ELECTRICALLY CONDUCTIVE FILLERS TO DISSIPATE ELECTRICAL OR ELECTROSTATIC CHARGES

ABSTRACT

Electrostatic discharges (ESD) cause millions of dollars in damage to the economy every year. Today's commercially available systems for adhesive bonding and encapsulating components relevant to ESD and electromagnetic compatibility (EMC) are often based on epoxy resins, which especially provide a limited elasticity. The aim of the investigations is to show how existing application restrictions can be effectively eliminated by the development of new adhesives while at the same time reducing follow-up costs caused by ESD.

In line with this topic, the targeted modification of polyurethane- and silicone-based adhesives as well as casting compounds by the use of carbon nanotubes (CNTs) is being investigated within the scope of the project "ESDBond" (IGF-No. 20459 BG) funded by the Federal Ministry of Economics and Energy (BMWi). The results of relevant property changes of these modifications and the suitability of different silicone-based adhesive formulations for use as ESD/EMC adhesives and encapsulants will be presented. Electrically conductive networks can be formed within the otherwise electrically insulating polymers by integrating CNTs with a content of << 0.5 wt.%. This enables corresponding discharge capabilities in combination with minimal influences on the remaining property profile. In this scope, the results of relevant property changes of these modifications are presented in dependence on the fillers applied as well as filling degrees, dispersion methods and suitability of different adhesive formulations.

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