

Sulfanilamide/Epoxy Resin and Its Application as Tackifier in Epoxy Adhesives

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Abstract : Tackiness is described as the ability to spontaneously form a bond to another material under light pressures within a short application time. During the first few minutes of the adhesive's curing, it is necessary to have enough tack to keep the substrates together while cohesion is increasing within the adhesive. This property plays a key role in the manufacturing process of pieces. Epoxy adhesives, unlike other adhesives, usually present low tackiness before curing; however, there is very little literature about the use of tackifiers in epoxy adhesives, except for the high molecular weight epoxy additives. In the present work, a tetrafunctional epoxy resin based on Bisphenol-A and Sulfanilamide has been synthesized in order to be used as a tackifier. This additive offers improved specific adhesion to two-component (2K) epoxy adhesives. The dosage of the tackifier has to be done carefully not to alter the mechanical and rheological properties of the adhesive. The synthesized product has been analyzed by FTIR and ¹H-NMR analysis, and the effect of the addition of 1 wt % of the tackifier on rheological properties, viscoelastic behavior, and mechanical properties has been studied. On one hand, the addition of the product in the epoxy resin part showed a significant increase in tackiness regarding the neat epoxy resin. On the other hand, tackiness of the whole formulation was also increased. Curing time of the adhesive has not undergone any relevant changes with the tackifier addition. Regarding viscoelastic properties, Storage Modulus (G') and Loss Modulus (G'') remain also unchanged at ambient temperature. Probably, in case higher tackifier concentration would be added, differences in viscoelastic properties would be observed. The study of mechanical properties shows that hardness and tensile strength also keep their values unchanged regarding neat two component adhesive. In conclusion, the addition of 1 wt % of sulfanilamide/epoxy enhanced the tackiness of the epoxy resin part, improves tack without modifying significantly either the rheological, the mechanical, or the viscoelastic properties of the product. Thus, the sulfanilamide presented could be a good candidate to be used as an additive to the 2k epoxy formulation for the manufacturing process of pieces.

Keywords : epoxy adhesive, manufacturing process of pieces, sulfanilamide, tackifiers

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