

Two component polyurethane adhesives for advanced automotive manufacturing

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The automotive industry has seen a trend to reduce the weight of vehicles. In order to follow the light-weight strategies, a variety of different metals, reinforced plastics, and other materials have been implemented. This multi-material mix is requiring new joining methods.^[1] Adhesives have been established as an important joining method both to facilitate the assembly process of cars but also to enable new joining capabilities of a variety of materials as well as to improve the performance of the vehicles.^[2] Two part (2K) polyurethane (PU) adhesives are selected as a process of choice to assemble parts in the trim shop since they show i) a good stress distribution in bonded parts in comparison with locally mechanically fixed assemblies, ii) the ability to bond complex shapes, iii) the ability to bond dissimilar materials as well as iv) the capability to offer tailorable curing kinetics. We report the development and implementation of latent 2K PU adhesives which show a long open time followed by a fast cure at room temperature. The open time offers assembly flexibility and improved material consumption, the rapid cure at room temperature allows advanced assembly processes. Further the adhesives are designed such that they can be cured fast by heat allowing cycle times down to less than one minutes. The combination of modulus and elongation offers superior crash management and long term durable assemblies also for dissimilar materials.

The presentation will shows the DOW Automotive Systems latest developments in two part polyurethane adhesive technology, it lists applications in the area of composite bonding and provides an insight into structure - property relationships that are the basis for above outlined requirements.

[1] A. Lutz, S. Schmatloch, *Adhäsion Kleben + Dichten*, **2014**, 9, 30 - 34.

[2] S. Grunder, S. Schmatloch, A. Lutz, *Adhäsion Kleben + Dichten*, **2017**, 3, 34 - 37.