

Designing hot melt adhesives for application at lower temperatures

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Abstract:

Thermoplastic hot melt (TPHM) adhesives comprise polymers to provide strength and hot tack. Tackifiers are formulated to dilute the polymer entanglement network, lower the viscosity and improve wetting. Conventional TPHMs are based on polyolefins and are typically applied at 170 °C. “Cool” TPHM adhesives have been designed for application at 100-130 °C, enabling users to save energy and work more safely. These “cool” adhesives are obtained from changing raw materials and formulation strategy. This produces a different morphology and provides a similar level of performance to conventional TPHMs.

Moisture curing reactive hot melt (RHM) adhesives are based on polyurethanes, typically providing stronger bonds which are more durable. RHM adhesives comprise copolymers where the architecture is tailored to meet the combination of thermal stability during processing, green strength and final adhesion/durability. Conventional RHMs are typically applied at 130 °C. Unique polymer architectures have been developed which allow processing at 90 °C – again providing energy savings and increased safety to the end-user. New comonomers are used to increase the level of cohesion in the polymer backbone but formulation is required to provide a functional adhesive via a different morphology, enabling the complex set of requirements to be reached.