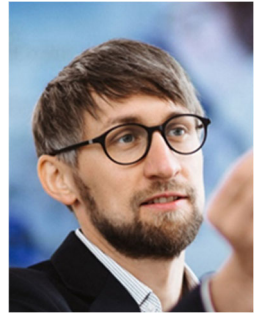


Dr. Christoph Bornschein
Innospec Leuna; DE Leuna



NOVEL HIGH PRESSURE PO-WAXES AND POLAR MODIFIED ADHESION PROMOTORS IN HOTMELT ADHESIVES

In hotmelt adhesives, especially if applied via dye, a good flow and spray ability is of particular importance. As hotmelt formulations constitute of a high polymer content, to obtain the desired cohesion properties, the role of improving flowability is typically fulfilled using waxes. As such these low molecular weight “polymers” typically have a negative impact on cohesion properties.

The vast major part of waxes used in the hotmelt industry are derived from the Fischer-Tropsch synthesis. These waxes, linear by nature yield an efficient “dilution” of the formulation and a fast set. Besides these obvious benefits, especially Fischer-Tropsch waxes, but also classical PE-waxes suffer of a negative influence, when it comes to adhesion potential. As higher the crystalline character of the wax the worse this effect, yielding almost to a separation of hotmelt and substrate.

Innospec Leuna GmbH products are already present in hotmelt formulations for many years, making the hotmelt adhesives industry to one of our major applications. Our LDPE-waxes were classically branched and therefore able to support the adhesion and cohesion potential of a formulation through entanglements with the base polymer matrix and an effective substrate wetting.

The mentioned concept was further explored and products of a much higher degree of branching were envisaged and finally produced. These novel products exhibit a decreased density, and crystalline character, yielding in a further improvement in adhesion on the test substrate, a hard-to-bond craftliner surface, compared to a standard substrate only using FT-waxes to improve the flow. In our study we could nicely showcase the impact of density towards adhesion what gives the end-user with a versatile tool to get have a fine-tuned solution between adhesion and crystallinity.

Moreover, in a later stage, we developed polar (MA) modified versions of our new and established waxes to further boost the adhesion potential of our products. Like the non-modified products, the more amorphous waxes yielded the best performance at the evaluated substrate. Similar to the new amorphous waxes, these polar modified versions constitute suitable tools for the adhesive developer to balance the different properties of adhesion, setting and cost.

Unlike in conventional hot melts adhesives, it is common knowledge that the viscosity of hot-melt pressure-sensitive adhesives cannot be reduced using waxes, as ordinary crystalline waxes tend to reduce tack drastically. So, it is controlled instead by temperature or by formulating with tackifier resin or oil. Nevertheless, the new less crystalline VISCOWAX grades won't have a negative impact on tack and due to their amorphous structure, can additionally retard oil migration and therefore maintain tack and adhesion for a longer period.