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Model Studies for the Blending of ABS and PA

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Polymer alloys based on ABS (Acrylonitrile-Butadiene-Styrene) and Polyamide 6 offer a ecellent combination of toughness, stiffness, chemical resistance and processing behaviour. Therefore such materials are widely used in automotive and other engineering applications. Although these materials are on the market since almost 20 years, still a lot of work in this area is going on in academia and industrial labs. The compatibility between the two immsicible components SAN and PA 6 is usually achieved by SAN-g-PA 6 copolymers, which are formed during the melt mixing step by the reaction of Styrene-Acrylonitrile-Maleic Anhydride Terpolymers and the PA 6. In order to improve such resins further, it would be desireable to understand all the different processes that are on-going during the compouding step of ABS/PA 6-alloys. The chemical analysis of ABS/PA 6 blends and alloys is complicated, especially the separation of the rubber phase is hard to achieve. Furthermore, a lot of interesting measurements are not possible due to the poor solubility of the PA 6. Therefore, a model system based on SAN and an amorphous PA, Trogamid T 5000, was chosen to study different features of the reactive blending step. Various model alloys were prepared and the resulting materials characterised by chemical analysis, microscopy and mechanical measurements. In order to study the influence of the viscosity ratio, the molecular weight of the SAN was changed at a fixed composition (SAN/SANMA/Trogamid T 5000 70/5/25). Chemical analysis revealed a small increase of the conversion bewteen the SANMA and the Trogamid T 5000 with better match of the viscosities. This also gave a slight reduction of the particles size of the dispersed PA-phase. Furthermore the influence of the MA content of the SANMA-Terpolymer was studied in the SAN/SANMA/Trogamid T 5000-system. The smallest particles were obtained for a MA-content of 2 wt.-% in the SANMA-Terpolymer, in this system also the conversion of the amino-groups reached a maximum. Further details about theses studies will be dicussed during our presentation.