

Advanced coatings based on new polymer nanocomposites

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This presentation gives an overview of the WP2 activities towards the development of nanocomposite coatings based on the combination of polyester and polyacrylic resins, having attracted great interest as binders in the market of powder coatings systems and nanofillers. The incorporation of special nanoadditives in such polymeric resins can lead to hybrid nanocomposite powder coatings with enhanced key structural and functional features such as strength, hardness, gloss control, mechanical impact and UV resistance. In addition, the presence of nanoadditives cannot only reinforce significantly the physical properties of single polymer phases but can also affect the dynamics and morphology of polymer mixtures. Different clay-, silica- and carbon- based nanofillers were synthesized, surface-modified, and combined with powder coating resins aiming at the improvement among others of the mechanical properties of the final coating system. A range of techniques (XRD, FTIR, DSC, SEM, mechanical properties testing) were used to characterize the structural properties of the polymer nanocomposites. It was shown that the addition of nanofillers can indeed lead to an enhancement of the overall performance of the nanocomposite powder coatings.