

ABSTRACT

This dissertation deals with synthesis, properties and evaluation of suitability of hybrid polysiloxane-polymethacrylic powder coatings modifiers depending on composition of polysiloxane part of the modifier. The hybrid modifier (NPDASi) was obtained in a three step process: synthesis of partially cross-linked polysiloxane resin dispersion in water, synthesis of aqueous polysiloxane-polymethacrylic hybrid dispersion of core-shell nanoparticles (DASi) and subsequent spray drying of DASi dispersion.

The dissertation begins with a short introduction and specification of the purpose and scope of the study. In the theoretical part the effectiveness of using polysiloxanes in paints and varnishes and the general information about the chemical structure, properties, synthesis and application of polysiloxanes are discussed. Further, the basic information about the preparation of aqueous dispersions with hybrid core-shell particle structure is presented. The next part of the dissertation is the review of the literature relating to synthesis, properties and application of polysiloxane-containing core-shell particles with polysiloxane core. This review confirmed that it was right to conduct complex analysis of the effect of polysiloxane composition on the properties of dispersions and the corresponding nanopowders what, in turn, was expected to influence the properties of powder coatings modified with such nanopowders.

The experimental part begins with characterization of starting materials and description of the subsequent stages of obtaining the final products as well as of the applied methods and techniques for characterizing their properties.

Next, the results of the study are discussed focusing on the impact of polysiloxane composition on the selected properties of polysiloxane dispersions, core-shell hybrid dispersions, nanopowders and the properties of powder coatings modified with such nanopowders.

The dissertation is concluded with a short summary of the results.