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PHYSICOCHEMICAL METHODS FOR STABILITY RESEARCH AND FORMULATION DEVELOPMENT

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Methods of applied physical chemistry are of great importance for formulation research and development as well as for research on the stability of intermediate and final products. More specifically, the most important areas are colloid and interface science, solid state chemistry of organic molecules, and some aspects of chemical or pharmaceutical engineering, such as industrial crystallization or powder processing.

While the most common pharmaceutical dosage forms are solid or semisolid, i.e. tablets, capsules, ointments or gels, concentrated suspensions, granulates, or emulsions are frequently encountered in agrochemical products, paints or textile dyes. Common to most of these systems is that they consist of an organic active component (active substance or active ingredient) in form of small particles with a size range from about 100 nm to a few microns. Each active component exhibits its individual solid state properties while being an entity of a colloidal system in conjunction with the surfactants and excipients of the formulation.

It is evident that stable industrial processes, stable final products, or even formulations with tailor made properties in terms of bioavailability are only obtained if the solid state properties of active components and excipients, and their physicochemical interactions within the system are well understood. Application of a wide range of physicochemical and analytical methods as applied at Solvias AG is essential for the investigation of intermediate and final products towards improvement of their stability and performance. Another area of Solvias is contract research on unstable systems in order to find the root causes for undesired effects such as irreproducible granulation, unstable suspension concentrates, changes of the solid state properties of one of the components of a formulation or just to investigate the causes of out of specification results in quality assurance.

The scientific project leaders at Solvias AG possess profound knowledge on a broad spectrum of methods ranging from rheological characterization, evaluation of phase diagrams, polymorphism investigations, interactions of surfactants at interfaces, electrokinetics, sedimentation, microscopy, particle characterization, and spectroscopy. A small team of specialists will design a suitable investigation program to answer the questions of customers.

This contribution presents selected topics of applied colloid and interface science. The focus will be on rheological and electrokinetic characterization of concentrated suspensions, interactions of surfactants at interfaces, and some aspects of solid state chemistry. Currently, an important part of our activities is related to the electroviscous effect and the behaviour of concentrated suspensions and emulsions.