preformulation studies. Vibrational spectroscopy allows the real-time in situ monitoring of phase transformations and probes intermolecular interactions between API molecules, between API and polymer in amorphous solid dispersions or between API and coformer in cocrystals or coamorphous systems and thus plays a major role in efforts to gain a predictive understanding of the relative stability of solid-state forms and formulations. Infrared (IR), near-infrared (NIR) and Raman spectroscopies, alone or in combination with other analytical methods, are important tools for studying transformations between different crystalline forms, between the crystalline and amorphous form, between hydrate and anhydrous form and for investigating solid-state cocrystal formation. The development of simple-to-use and cost-effective instruments on the one hand and recent technological advances such as access to the low-frequency Raman range down to 5 cm-1, on the other, have led to an exponential growth of the literature in the field. This review discusses the application of IR, NIR and Raman spectroscopies in the study of solid-state transformations with a focus on the literature published over the last eight years.

Gajdziok, J. and B. Vranikova (2015). "Enhancing of drug bioavailability using liquisolid system formulation." *Ceska Slov Farm* 64(3):55–66.

One of the modern technologies of how to ensure sufficient bioavailability of drugs with limited water solubility is represented by the preparation of liquisolid systems. The functional principle of these formulations is the sorption of a drug in a liquid phase to a porous carrier (aluminometasilicates, microcrystalline cellulose, etc.). After addition of further excipients, in particular a coating material (colloidal silica), a powder is formed with the properties suitable for conversion to conventional solid unit dosage forms for oral administration (tablets, capsules). The drug is subsequently administered to the GIT already in a dissolved state, and moreover, the high surface area of the excipients and their surface hydrophilization by the solvent used, facilitates its contact with and release to the dissolution medium and GI fluids. This technology, due to its ease of preparation, represents an interesting alternative to the currently used methods of bioavailability improvement. The article follows up, by describing the specific aspects influencing the preparation of liquid systems, on the already published papers about the bioavailability of drugs and the possibilities of its technological improvement. Key words: liquisolid systems bioavailability porous carrier coating material preformulation studies.

Hageman, M. J. (2010). "Preformulation designed to enable discovery and assess developability." *Comb Chem High Throughput Screen* 13(2):90–100.

Physicochemical properties of drug molecules impact many aspects of both in vivo and in vitro behavior. Poor physicochemical properties can often create a significant impediment to establishing reliable SAR, establishing proof of principle type studies using in vivo models, and eventually leading to added performance variability and costs throughout the development life cycle; in the worst-case scenario, even preventing execution of the desired development plan. Understanding the fundamental physicochemical properties provides the basis to dissect and deconvolute experimental observations in such a way that modification or mitigation of poor molecular properties can be impacted at the design phase, insuring design and selection of a molecule which has a high probability of making it through the arduous development cycle. This review will discuss the key physicochemical properties and how they can