

Investigation of pharmaceuticals by Infrared and Raman micro spectroscopy

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The discovery of appropriate forms of active pharmaceutical ingredients (API) is often crucial for a successful drug development. New salts and polymorphs can lead to enhanced properties such as chemical or physical stability, activity, and bioavailability. As Raman spectroscopy is fast, non-invasive and very reliable, it is broadly used to study polymorphisms of API's. As Raman spectroscopy can also be used within confocal microscopes, polymorphism studies can even be performed non-invasively in multilayer tablets. Usually, the Raman spectrum of the API differs clearly from the spectrum of all other tablet components. Therefore, Raman is also often applied to analyze the distribution of the API within tablets or pharmaceutical powders. For this task also focal plane array Fourier transform infrared (FTIR) imaging is used. With this technique areas of about 350 x 350 μm can be analyzed simultaneously with a lateral resolution of about 3 μm . As focal plane array imaging can even be used in attenuated total reflection mode, all different types of tablets can be analyzed.

In this contribution typical applications of vibrational spectroscopy in pharmaceutical R&D are shown. Moreover, newest and user relevant advances in Raman and FTIR microscopic instrumentation are presented.