

Solid-State Analysis of Pharmaceuticals: Solid-State NMR and PXRD

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The ability to effectively deliver solid pharmaceuticals is directly related to the form of the drug in the solid state. This is important because more than 70% of all pharmaceuticals are formulated as solids. Drugs may be formulated in several different states, including amorphous, crystalline, or diluted with excipients. In addition, many drugs exhibit polymorphism, or the ability to exist in two or more crystalline phases that differ in the arrangement or conformation of the molecules in the crystal lattice. We are developing solid-state NMR spectroscopy as a technique for the analysis of pharmaceuticals. We are particularly interested in characterizing the effects of formulation on the properties of pharmaceutical solids.

In this seminar new developments and applications of solid-state ^{13}C NMR spectroscopy with cross polarization (CP) and magic-angle spinning (MAS) to study pharmaceuticals will be presented. We will show several examples of how solid-state NMR and PXRD can provide useful information about pharmaceutical systems. The ability to identify and quantify the amounts of multiple crystalline and amorphous forms present in formulations will be described. The ability to study common pharmaceutical excipients will be presented. Finally, correlations of formulation parameters with line widths and relaxation times will be presented.

Biography

Eric Munson received his B.A. degree from Augustana College in Sioux Falls, South Dakota. After studying one year in Munich, Germany, on a Fulbright Fellowship, he continued his education at Texas A&M University, where he received his Ph. D. degree in 1993. He then spent one year as a postdoctoral fellow at the University of California, Berkeley, under the direction of Professor Alexander Pines. In 1994 he started as an Assistant Professor in the Chemistry Department at the University of Minnesota, and was promoted to Associate Professor in 2000. In 2001 he moved to the Pharmaceutical Chemistry Department at the University of Kansas, where he was promoted to Professor in 2006. His research program is focused on the characterization of pharmaceutical solids using a variety of analytical techniques, with an emphasis on solid-state NMR spectroscopy. He is a recipient of an NSF CAREER award and a McKnight Land-Grant Professorship.