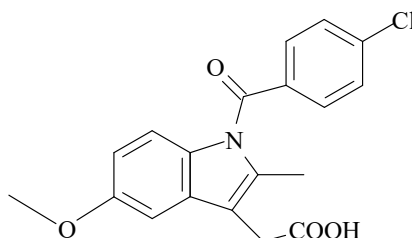


Differentiation of pharmaceutical polymorphs by solid-state NMR

Product used : Nuclear Magnetic Resonance (NMR)

Crystal polymorphs often have different physical and chemical properties, and hence the biological activity of a drug which forms crystal polymorphs may be affected. For this reason, crystalline form control is very important in pharmaceutical and medicinal applications. Information about the crystal structure of a drug cannot be obtained by solution-state NMR spectroscopy, because the crystal structure is invariably lost upon dissolving the material in a solvent. However, crystal forms can be readily studied and differentiated by solid-state NMR.

Indometacin, also known as indomethacin, is a non-steroidal anti-inflammatory drug used to reduce fever and pain. Indometacin forms various crystal forms, depending on the crystallization conditions. The figure below shows solution- and solid-state ^{13}C NMR spectra of indometacin in three different forms, α -form, γ -form and amorphous form. There is obviously no difference in the solution-state spectra of the polymorphs; however, the solid-state spectra are clearly differentiated and allow each form to be identified.



Indometacin

【 ^{13}C solution NMR】

Dissolved in CDCl_3

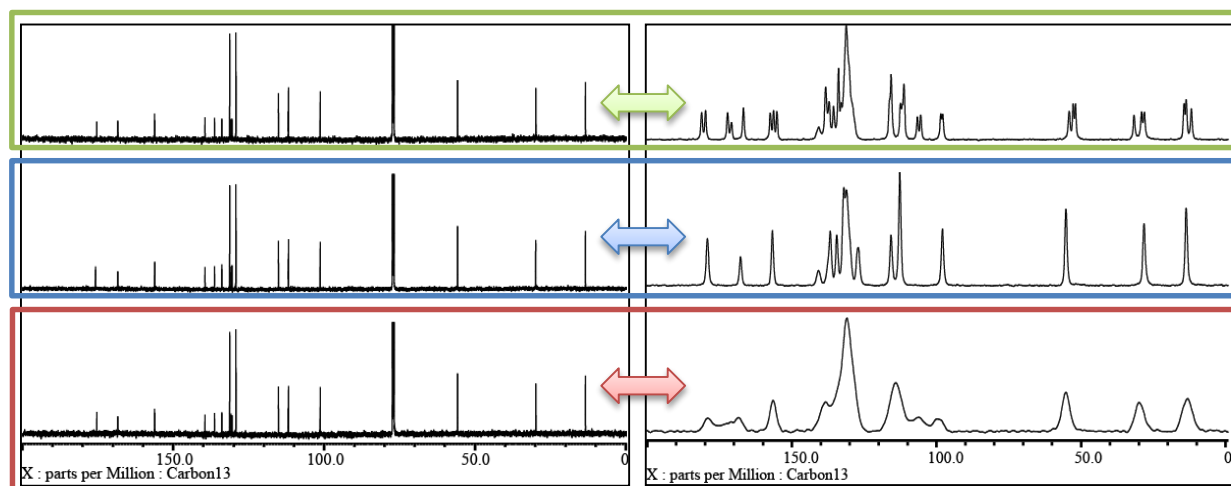
【 ^{13}C solid-state NMR】

Powder

α -form

γ -form

Amorphous
form



Instrument : JNM-ECZ500R, ROYALPROBE™ and 3.2mm CPMAS probe

Sample courtesy of Prof. Kenjiro Higashi, Chiba University, Japan

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