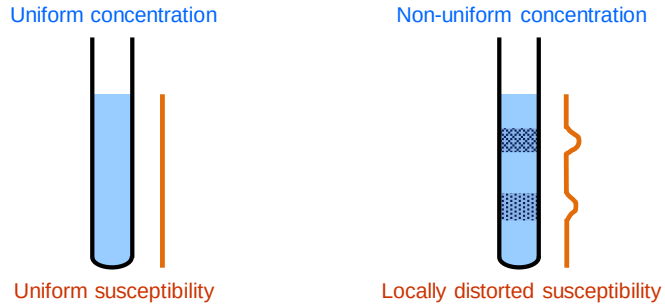
Is the sample dissolved uniformly? Insufficient dissolution reduces resolution.

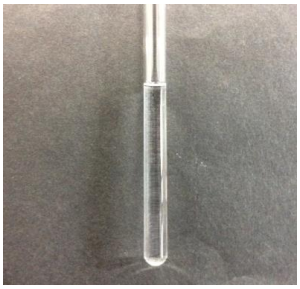
Product used : Nuclear Magnetic Resonance Spectroscopy (NMR)

As shown below, non-uniform sample concentrations cause local magnetic susceptibility distortion. Therefore, magnetic field adjustment is difficult, and good resolution spectra cannot be sometimes obtained. Please keep in mind that the sample concentration may be uneven, even if the sample appears to be dissolved.



Example of Menthol

Here, a simple example is shown with menthol solution. As we know, menthol is extremely soluble compound with methanol, and we would imagine it is very easy to dissolve completely. Menthol powder was placed in a NMR sample tube, and deuterated methanol was added to make a 10% solution. After NMR sample tube was shaking back and forth several times, sample solution became transparent as shown in the photo below. Figure A shows a spectrum obtained by measuring this sample, which has poor resolution. Subsequently, this sample tube was ejected from the magnet, and shaken well with same way. Figure B shows the spectrum of this sample after second well shaking, with a slight improvement in resolution, but still not enough. When this sample tube was shaken vigorously up and down finally, the resolution improved dramatically, as shown in Figure C. Even for easily soluble samples, it is important for good resolution spectra to completely dissolve NMR sample with solvent.

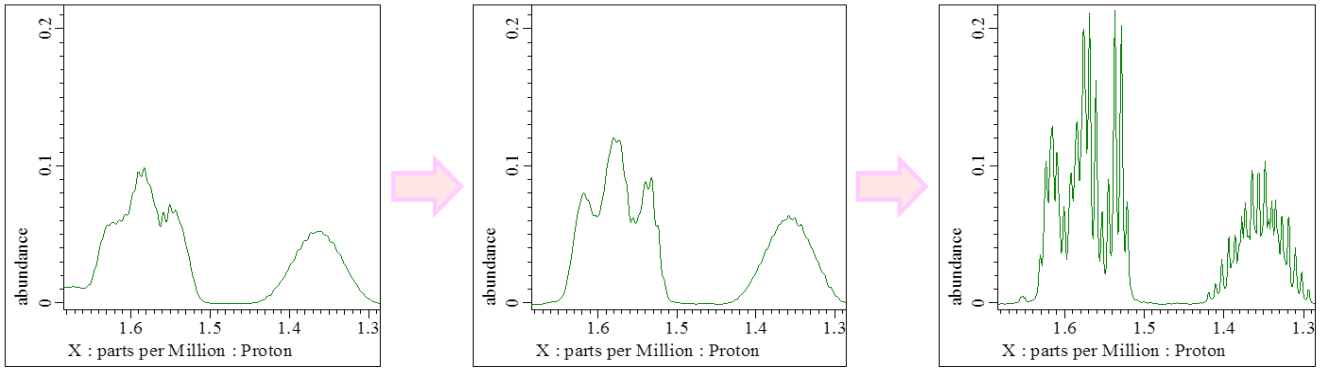


Extremely soluble

10% Menthol in Methanol-d_4

The sample became transparent by shaking it back and forth several times.

Even if the sample has a high solubility, shake it firmly until a uniform concentration is achieved.



(A) Shaking back and forth several times (B) Shaking back and forth many times (C) Shaking vigorously up and down

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