

Dynamic ^{13}C -Solid-State NMR Techniques for the Investigation of Organic Solids in Natural Isotopic Abundance

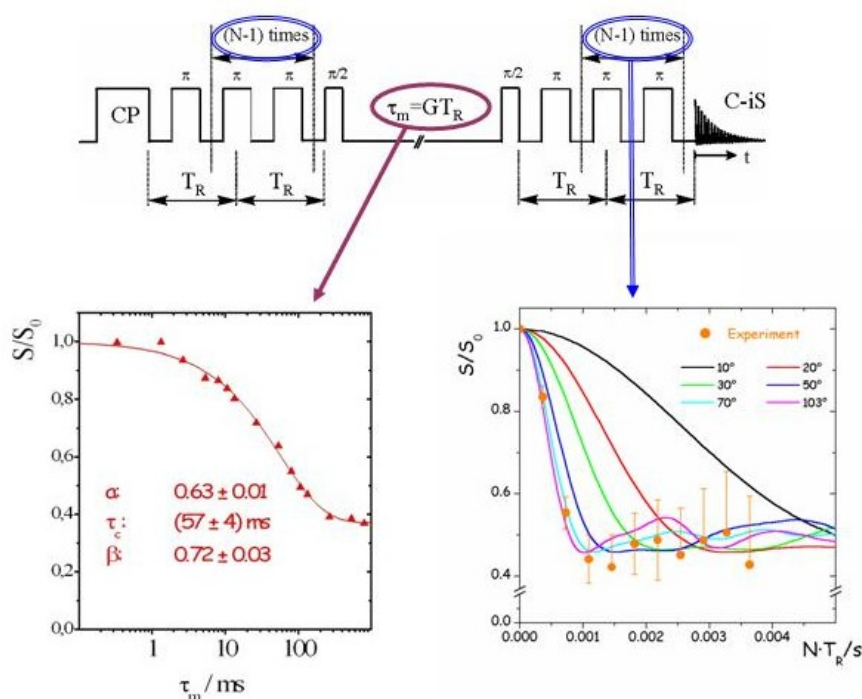
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We present experimental details about recently introduced Dynamic Solid-State NMR methods to investigate dynamic processes in organic solids. The methods are aimed to slow processes (CODEX ¹), i.e. with correlation times on the order of milliseconds and faster processes (DIPSHIFT ²) that extend the dynamic range of the methods to shorter correlation times. The application of these methods will be discussed in the talk of D. Reichert et al. as well in the poster of N.E. Hunter et al.

The CODEX-sequence is an example for a one dimension MAS-exchange experiment that enables to determine both the correlation time of motion as well as information about motional amplitudes. The figure below sketches the 2 modes in which the experiment can be performed: incrementing the length of the mixing period τ_m (left), the signal intensities of the resonances in the 1D-CODEX spectrum follow an exponential decay that is proportional to the correlation function of motion and from the correlation time and information about its distribution (parameter β) can be obtained from fitting. On the other hand, incrementing the so-called CSA-recoupling cycles $N \cdot T_R$, a damped oscillation of the signal intensities is found which is characteristic for the motional amplitude which can be extracted from comparison with calculated data.



We will further discuss the principle of the DIPSHIFT sequence and the application of both methods to the investigation of molecular dynamic processes in amorphous carbohydrates.

References:

- ¹ E.R. de Azevedo et al. (1999) *J. Amer. Chem. Soc.* **121**: 8411-8412
- ² M. Hong et al. (1997) *J. Phys. Chem.* **101**: 5869-5874