Dynamic Nuclear Polarization at 21.15 T and 65 kHz MAS

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Résumé

We present the first DNP MAS experiments using 0.7 mm rotors, allowing us to reach spinning frequencies of 65 kHz at 100 K and 21.1 T (900 MHz), the highest magnetic field available for DNP today.(1)
We show that the mixed radical HyTEK2 allows us to reach DNP enhancements as high as 200 at a MAS rate of 65 kHz, and the carbon-centered radical BDPA in an ortho-terphenyl glass yields an enhancement of 106. For the two systems, we observe the 1H DNP enhancements increasing with increasing MAS frequency, this behaviour has been interpretated using a spin diffusion model.

Faster MAS spinning frequencies enable exceptional 1H resolution in MAS DNP and stimulate the use of 1H detected spectra. We obtained resolved DNP enhanced 1H detected 1H–13C and 1H–15N correlation spectra of microcrystalline histidine·HCl·H2O.
(1) P. Berruyer, S. Björgvinsdóttir, A. Bertarello, G. Stevanato, Y. Rao, G. Karthikeyan, G. Casano, O. Ouari, M. Lelli, C: Reiter, F. Engelke, L. Emsley, Dynamic Nuclear Polarization Enhancement of 200 at 21.15 T Enabled by 65 kHz Magic Angle Spinning. *J. Phys. Chem. Lett.* **11**, 8386-8391 (2020).

*Intervenant