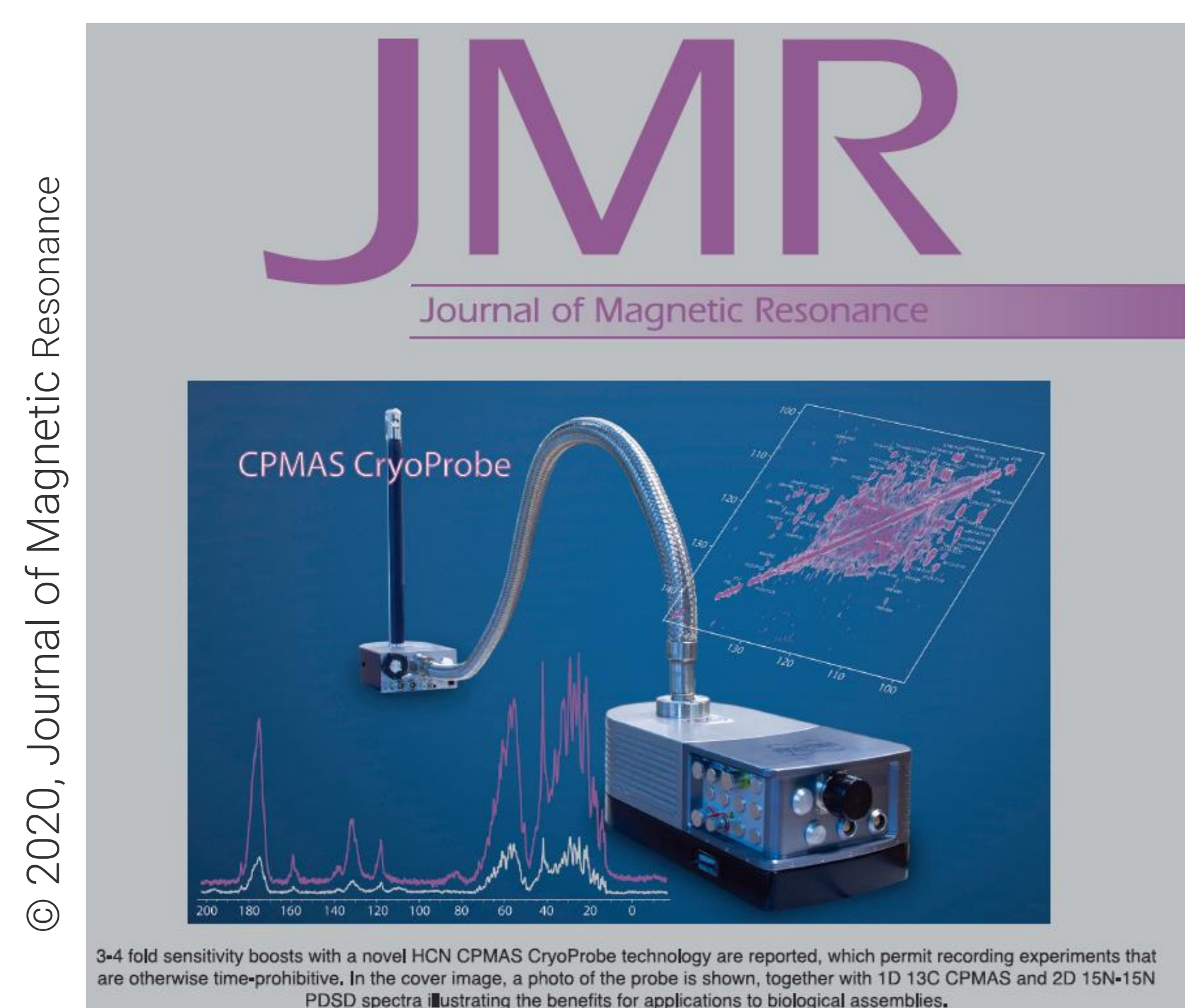


# BioSolids CryoProbe™

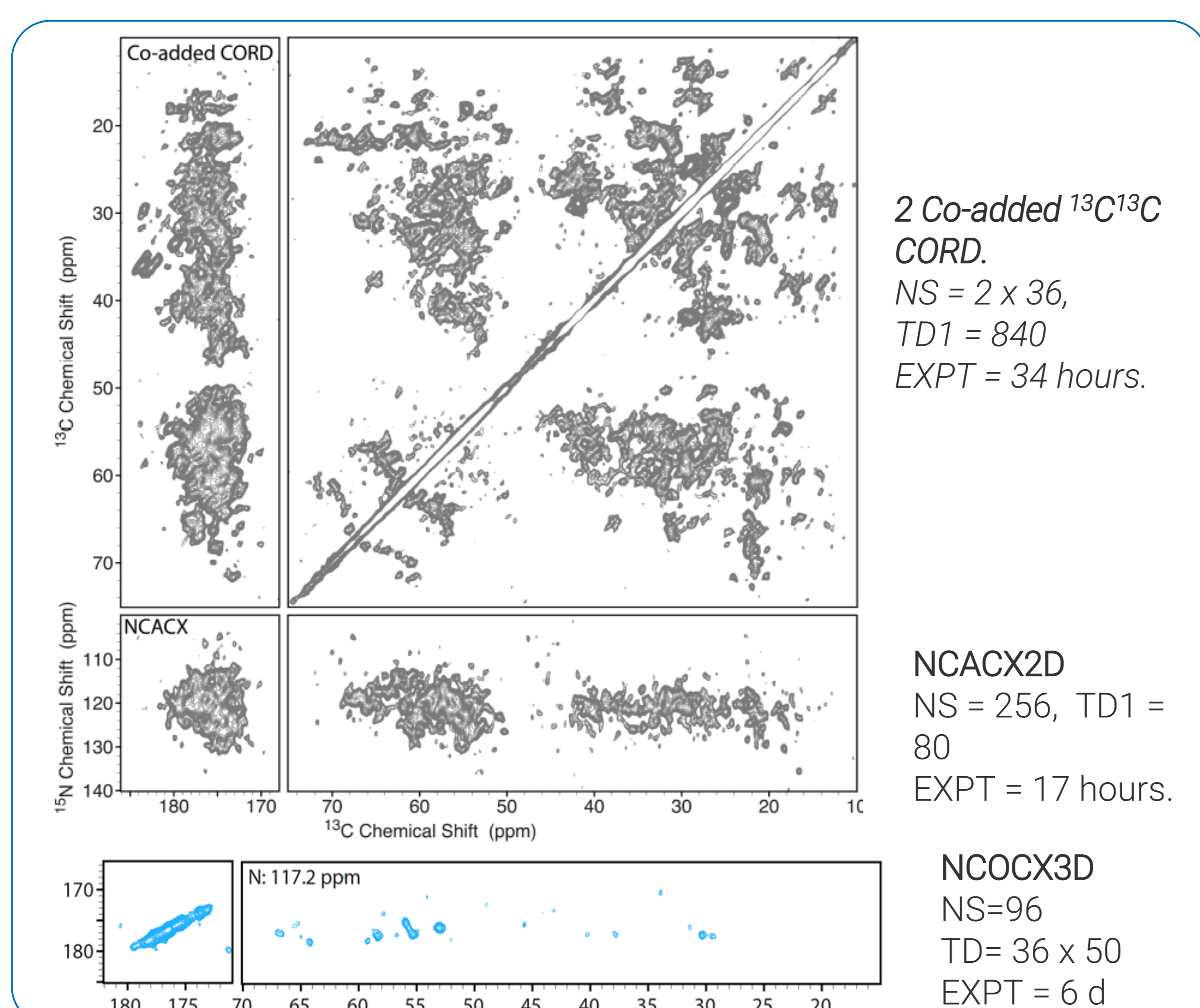
## Outstanding Sensitivity Enhancement

The new *BioSolids CryoProbe™* (part of the new CPMAS CryoProbe family) enables measuring sensitivity challenged samples or accelerating experiment time dramatically and thus advances the characterization of materials, natural products, biomolecules and polymorphs! The cryogenically cooled electronics and RF coil provides a larger than 3-fold improvement in sensitivity, thereby reducing standard experiment times by more than an order of magnitude, for regular as well as sample limited, partly filled rotors. Sensitivity gains and comparisons are discussed in detail in the JMR report from 2020, below.



## Biological Assemblies

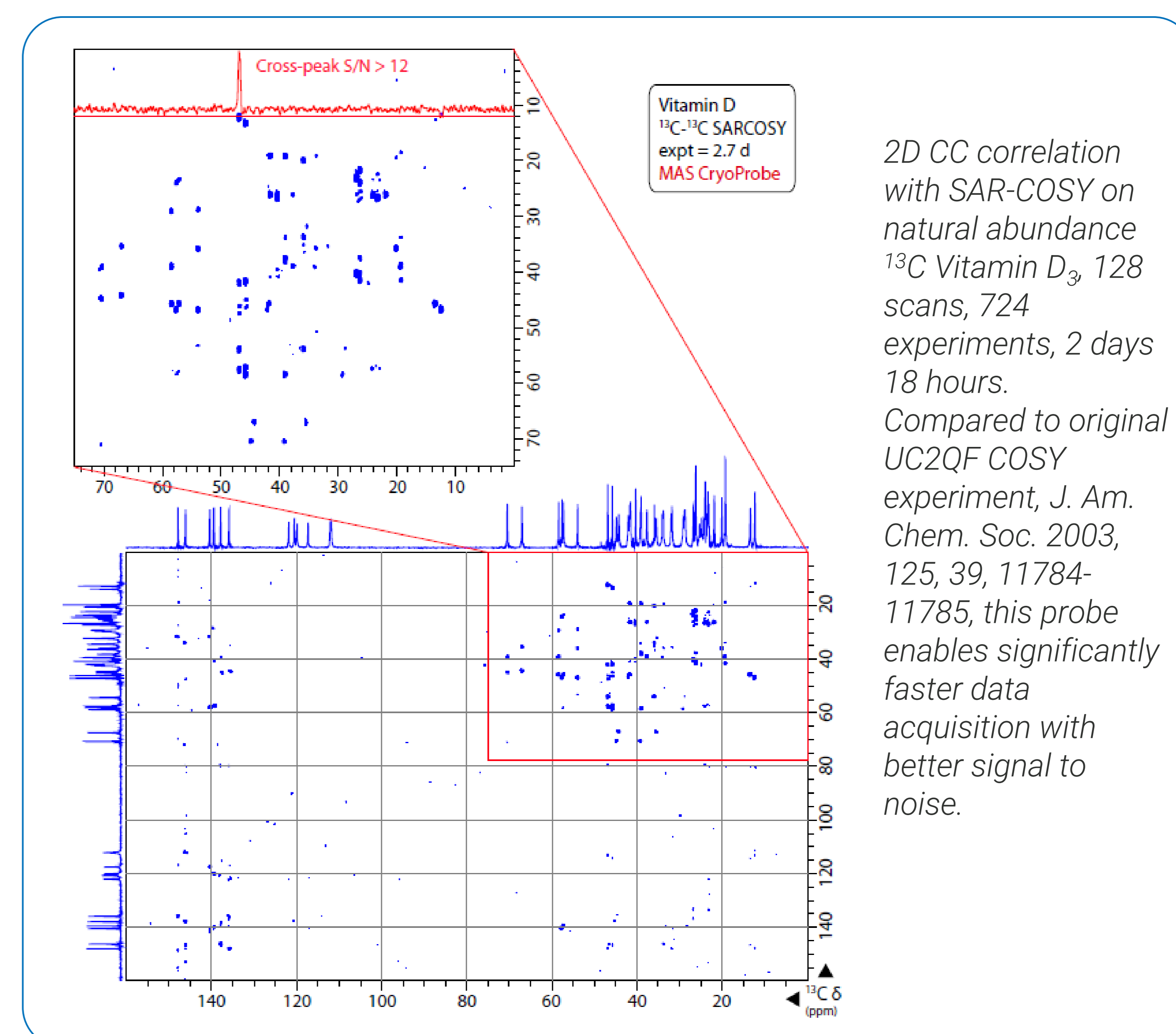
The triple resonance HCN BioSolids CryoProbe grants researchers the means to study challenging biological systems without altering the sample composition. Specifically, the enhanced sensitivity provided by the CPMAS cryoprobe enables the study of labeled protein in a native environment, as part of a macromolecular assembly. The characterization of these large complexes benefit from both, the significant boost in sensitivity as well as the generous rotor volume (85 ul). The CC-correlation spectrum, shown below, was recorded on a labeled protein (kinesin) forming a large complex with microtubules and illustrates these sensitivity benefits. The 3D-NCOCX spectrum, a standard experiment to elucidate the protein structures, was recorded in 6 days. The same experiment required on an 850 MHz magnet with a 3.2 mm e-free probe 19 days of acquisition with 25 % NUS.



Hassan, A.; Quinn, C. M.; Struppe, J.; Sergeyev, I. V.; Zhang, C.; Guo, C.; Runge, B.; Theint, T.; Dao, H. H.; Jaroniec, C. P.; Berbon, M.; Lends, A.; Habenstein, B.; Loquet, A.; Kummerle, R.; Perrone, B.; Gronenborn, A. M.; Polenova, T., Sensitivity boosts by the CPMAS CryoProbe for challenging biological assemblies. *Journal of Magnetic Resonance* 2020, 311, 106680.

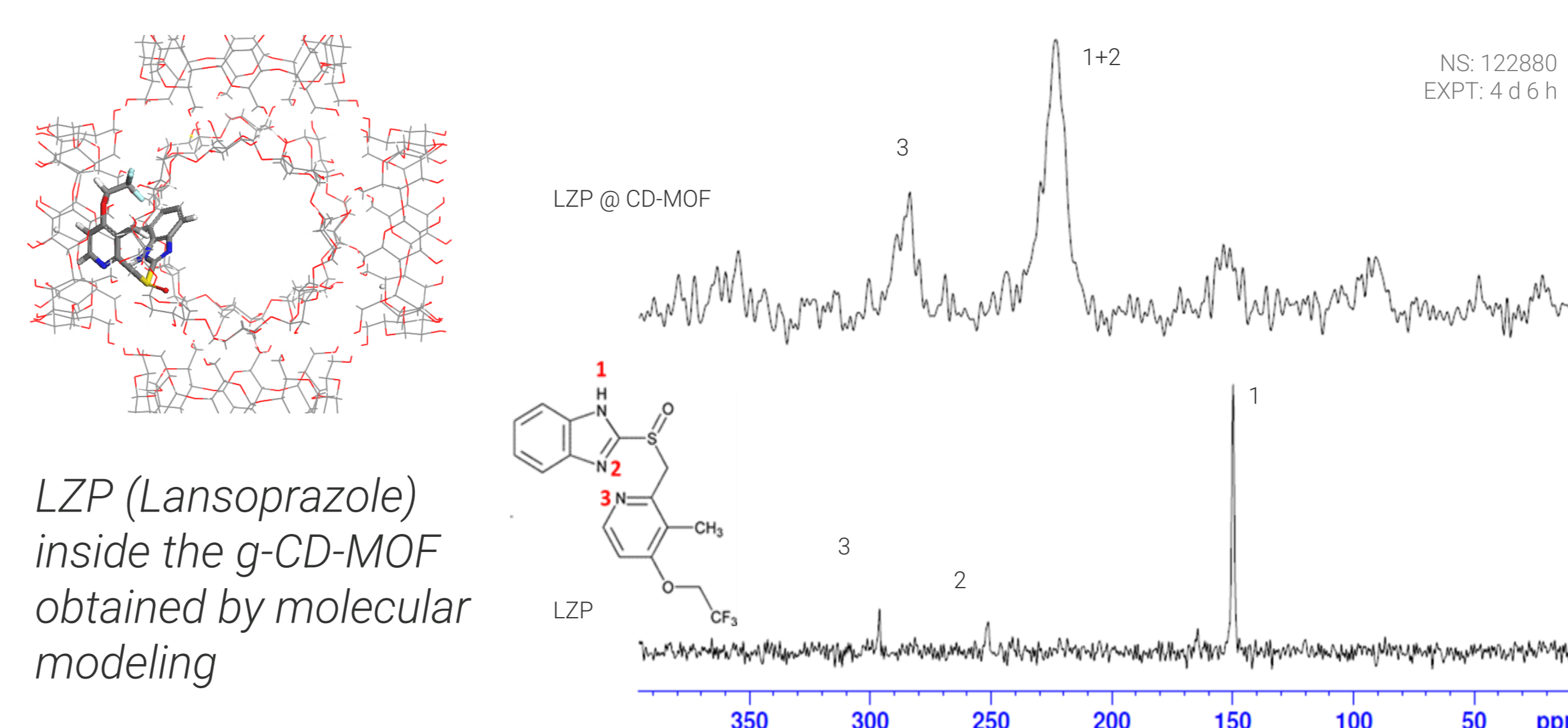
## Natural Abundance <sup>13</sup>C NMR

Homonuclear <sup>13</sup>C NMR applications are important for structural analysis. At the natural abundance <sup>13</sup>C level, such correlation experiments of molecular solids are challenged with low sensitivity requiring excessively long experiment times with conventional probes. Here we show an example of vitamin D<sub>3</sub> recorded with the CPMAS CryoProbe with almost ten-fold reduction of experiment time.



## Explore Dilute Samples

The new CP-MAS CryoProbe proved essential for the analysis of drug binding in the sponge like structure of a cyclodextrin-based metal-organic framework, loaded with a small amount of drug (Lansoprazole). The natural abundance <sup>15</sup>N CPMAS NMR spectra of this extremely dilute sample, showed clearly that the LZP is deprotonated upon loading into the CD-MOF (*C. Martineau, (Int. J. Pharm. 585 (2020) 119442)*).



## Key features of the BioSolids CryoProbe

- HCN with enhanced <sup>13</sup>C and <sup>15</sup>N sensitivities by a factor of >3
- One order of magnitude faster data acquisition and significantly increased productivity.
- Biosolids experiments, with strong RF fields and long spin-lock times and outstanding DCP yields.
- Automatic tuning, matching and magic angle adjustment and lift-assisted sample exchange.
- MAS rates up to 20 kHz