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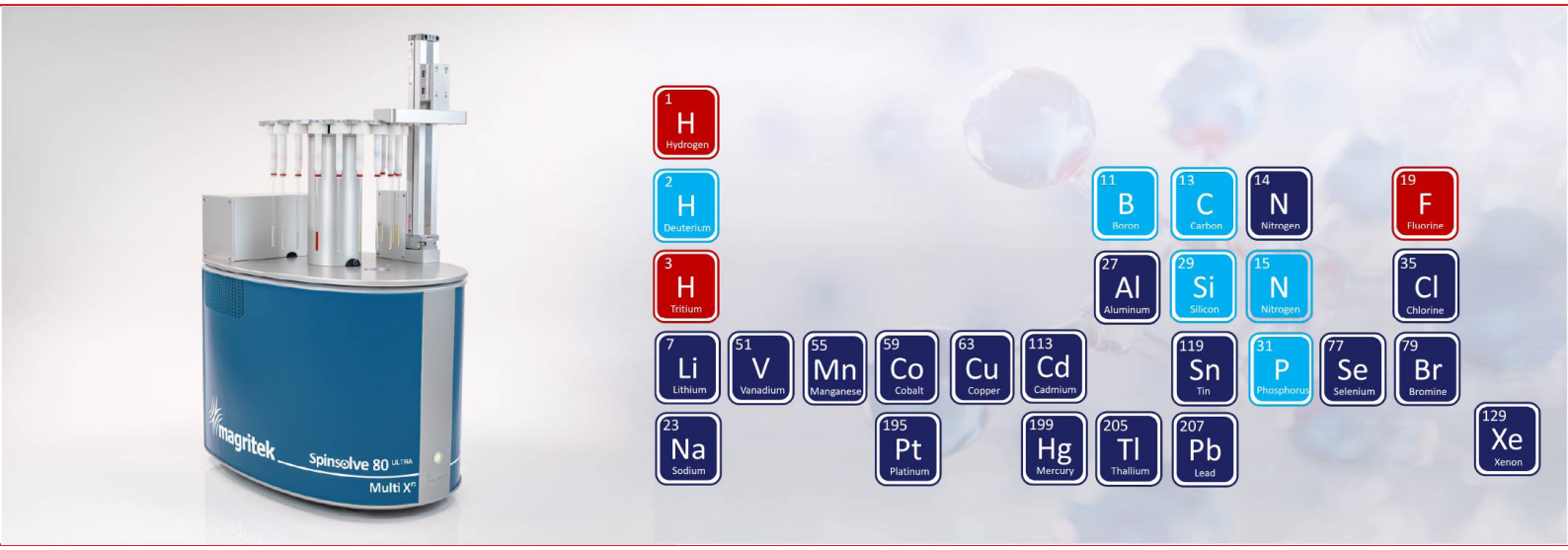
Spinsolve Multi X^n

The next Generation of fully automated multi-nuclear NMR

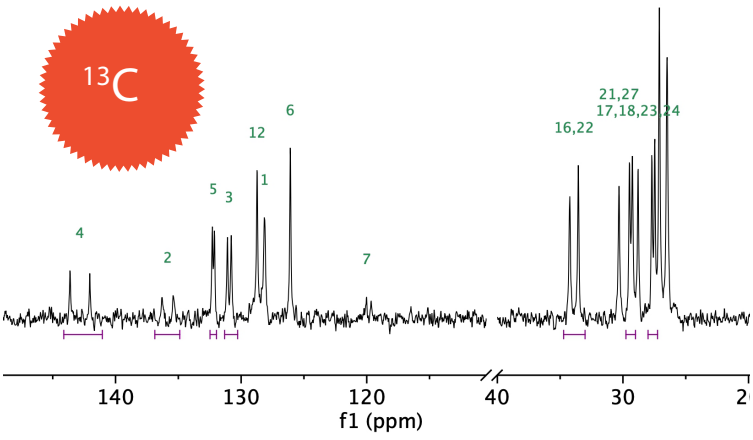
Measure all the nuclei you need with one NMR spectrometer in a fully automatic way

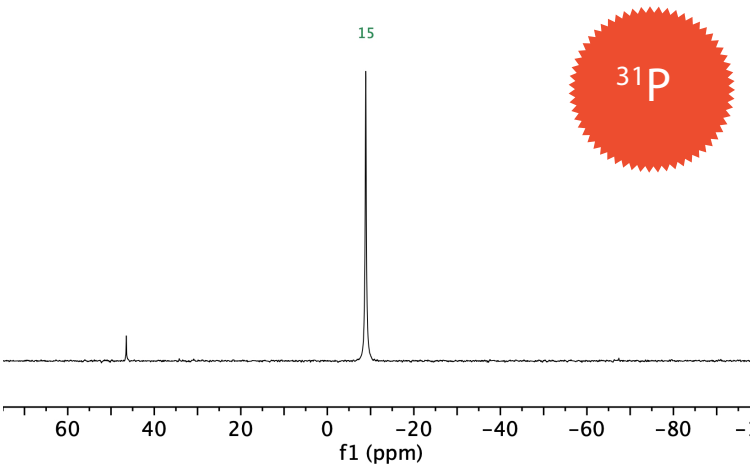


Benefits of the Multi X^n Probe

- Configure the system with unlimited number of nuclei
- Instant switching between nuclei without any loss in sensitivity
- No manual intervention required for switching nuclei
- Works with optional autosampler so all available nuclei can be acquired unattended
- Interleave multinuclear experiments for online reaction monitoring
- 1D and 2D experiments calibrated at factory, switch back and forth without recalibration
- No training requirement for operator

^{13}C and ^{31}P measured in a Spinsolve Multi X^n

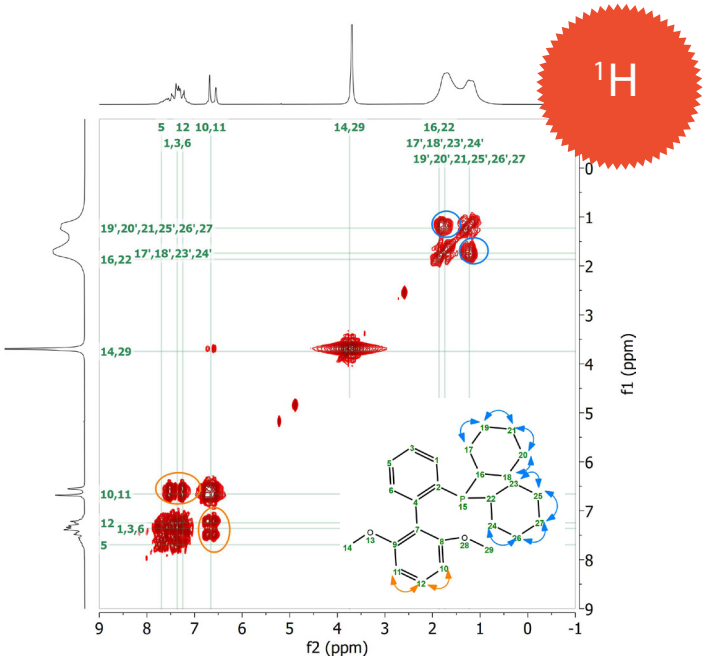




Extensive software library of pre-calibrated protocols for all available nuclei

2D COSY

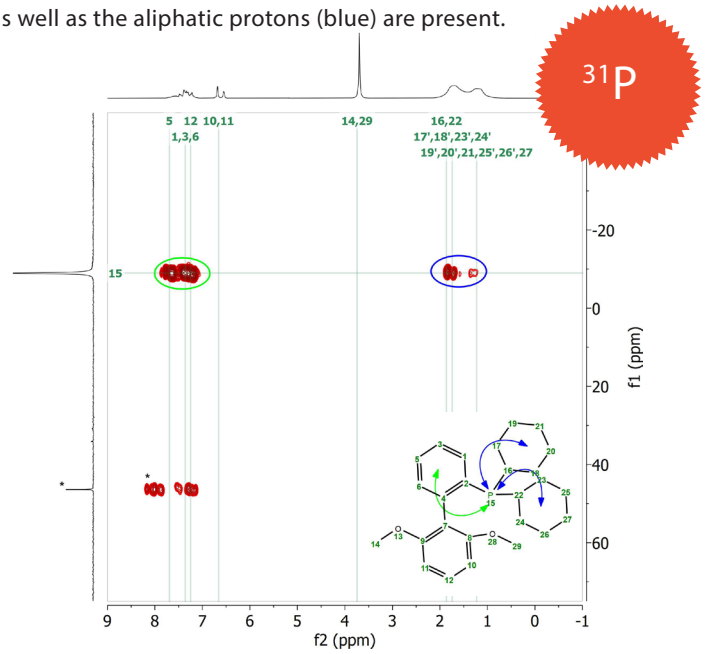
The 2D COSY experiment allows one to identify coupled ^{1}H nuclei as they generate cross peaks out of the diagonal of the 2D data set.



^{1}H 2D COSY experiment of a 800 mM SPHOS sample in $CDCl_3$ acquired on a Spinsolve Multi X 60 MHz system.

2D ^{31}P-HMBC

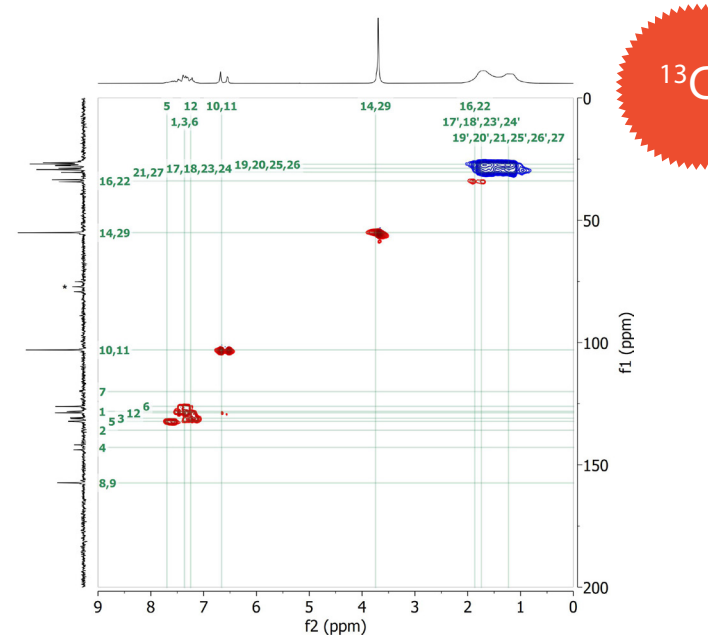
The long-range ^{1}H-^{31}P correlations can be observed for the phosphorus atom at position 15. It can clearly be seen that both couplings to the aromatic protons 1, 3, 5 and 6 (green) as well as the aliphatic protons (blue) are present.



^{31}P-HMBC NMR spectrum of a 800 mM SPHOS sample in $CDCl_3$ showing the long-range couplings between ^{1}H and ^{31}P nuclei.

2D HSQC-ME

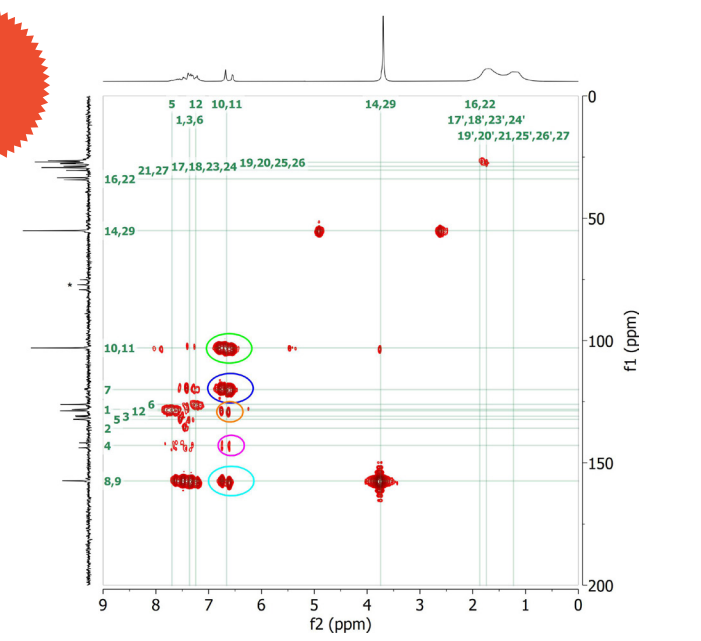
The HSQC is a powerful sequence widely used to correlate the ^{1}H with the one-bond coupled ^{13}C nuclei.



HSQC-ME spectrum of a 800 mM SPHOS sample in $CDCl_3$ showing the correlation between the ^{1}H (horizontal) and ^{13}C (vertical) signals.

2D HMBC

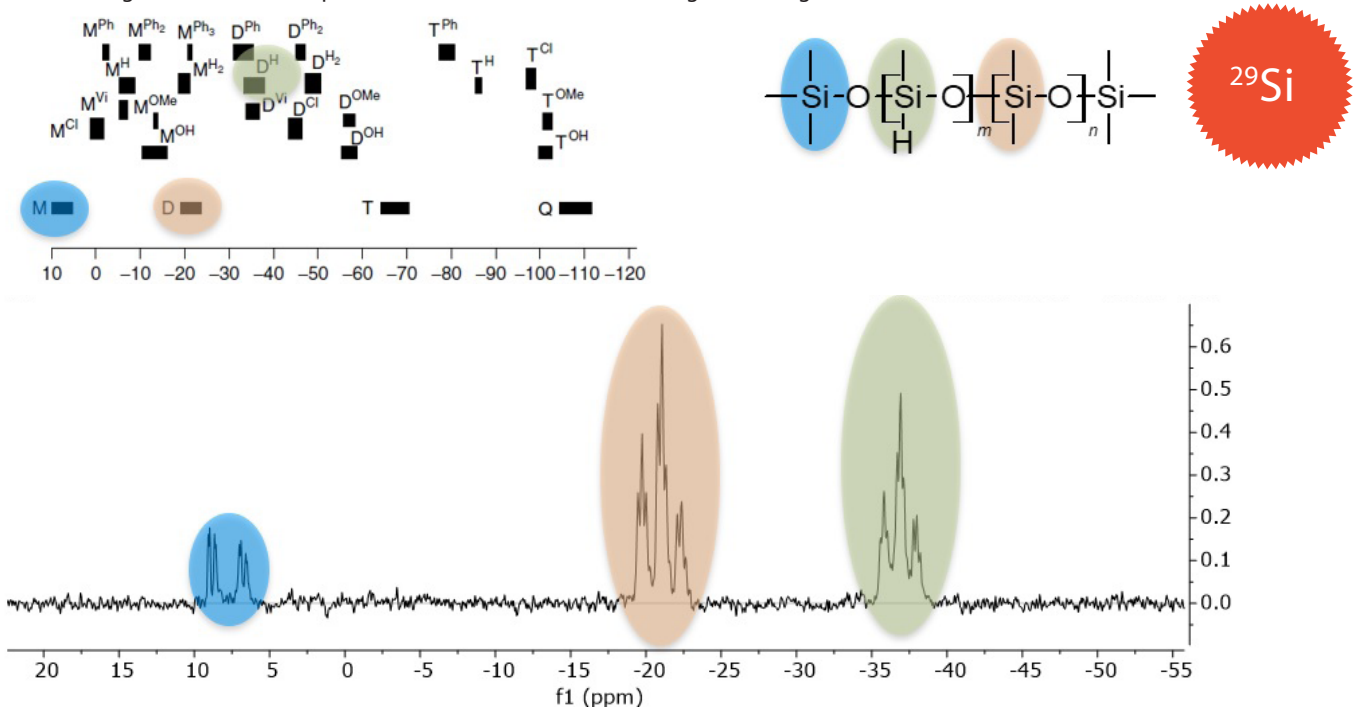
The Heteronuclear Multiple Bond Correlation (HMBC) experiment shows the long-range correlation of protons 10 and 11 with carbons 4, 7, 8, 9 and 12 (the sequence shows the correlation with quaternary carbons, too).



HMBC spectrum of a 800 mM SPHOS sample in $CDCl_3$ showing the long-range couplings between ^{1}H and ^{13}C nuclei.

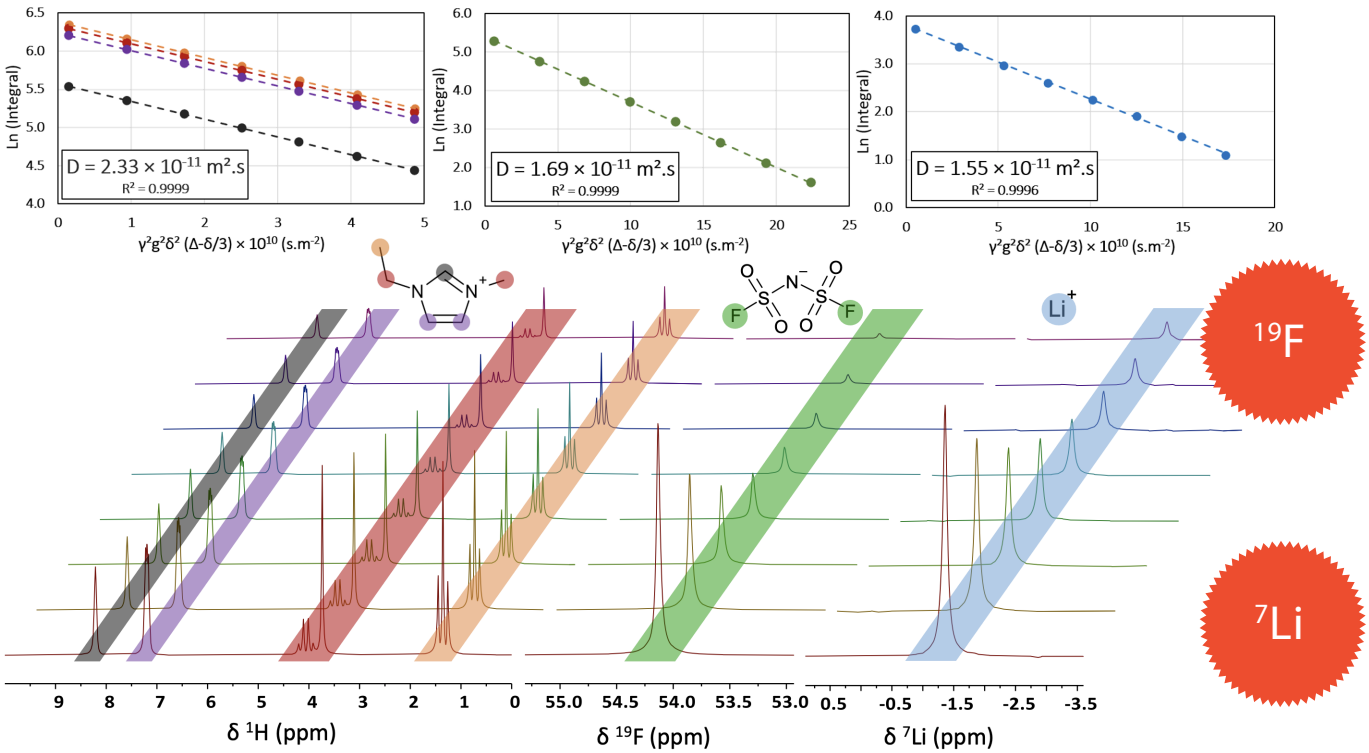
Spinsolve Multi X^n with ^{29}Si for structural characterization

The strong dependency of ^{29}Si chemical shift to the chemical environment makes silicon NMR a suitable tool to determine the composition of polysiloxanes. The figure below shows the DEPT spectrum of poly(dimethylsiloxane-co-methylhydrosiloxane), trimethylsilyl terminated, measured by setting the X channel of the Spinsolve to silicon. The result is in excellent agreement with the predicted chemical shifts of the single building blocks.



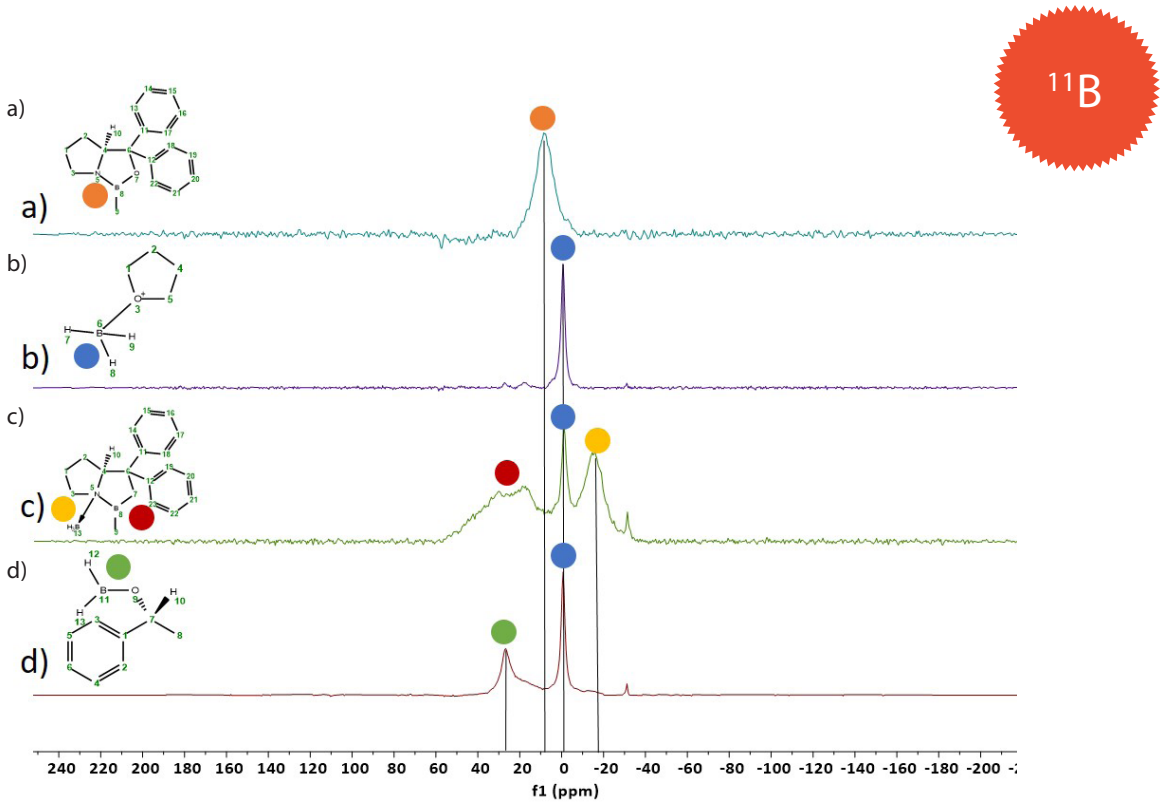
Spinsolve Multi X^n with optional PFG to measure molecular mobility

Pulsed field gradient (PFG) experiments are useful to asses the molecular mobility of different molecules dissolved in a mixture. By adding a gradient coil to the Spinsolve Multi X^n you can measure the diffusion coefficient of molecules containing any of the nuclei available on the spectrometer. The example below shows the ^{1}H, ^{19}F and ^{7}Li PFG experiments measured on a LiFSI:EmimFSI ionic liquid sample dissolved at a molar concentration of 2:3.



CBS reduction of acetophenone studied by ^{11}B NMR

To demonstrate the power of ^{11}B NMR we followed a typical CBS (Corey, Bakshi, Shibata) reduction reaction of acetophenone to its corresponding alcohol by using both ^{11}B and ^{13}C measurements on a Spinsolve Multi X^n system. The CBS reduction employs a boron containing catalyst (a), which is first activated with a borane solution in THF (b). The activated species (c) serves as the catalyst in the reduction of acetophenone. The final product (d) can nicely be observed in ^{11}B NMR. The final asymmetric alcohol is obtained after an acidic work up employing HCl in MeOH. These steps have been confirmed by ^{13}C NMR performed on the same spectrometer.



Spinsolve Multi X^n

- Nuclei: All models can measure ^{1}H and ^{19}F in the first channel and all the X nuclei you need, like ^{13}C, ^{15}N, ^{29}Si, ^{31}P, ^{7}Li, ^{11}B, and more, on the second channel
- Includes a powerful multi-line solvent suppression method
- Includes X-decoupled proton acquisition for all available X nuclei
- Available for ULTRA models with exceptional linewidth specifications
- Compatible with Spinsolve Temperature Control system
- Compatible with 0.5 T/m Pulsed Field Gradients for multi-nuclei diffusion studies

Contact us now for a quote, to request a demo, or to measure your samples

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