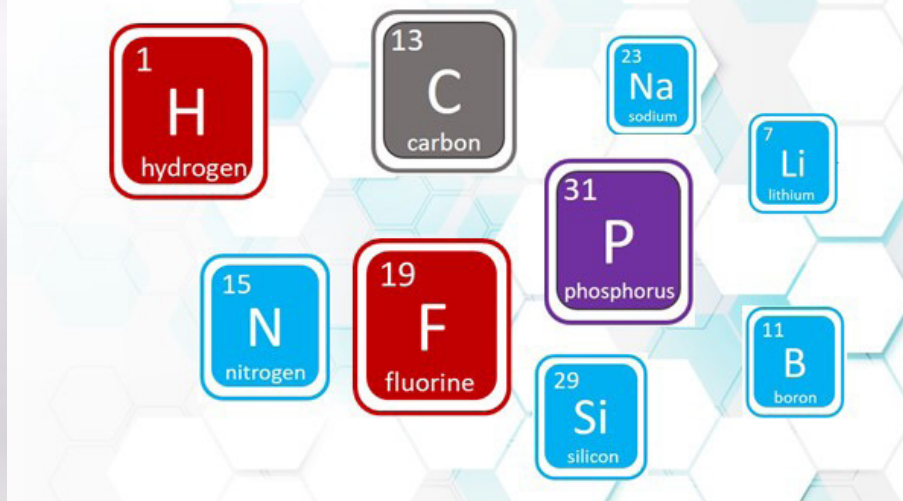


Spinsolve^{Multi X}

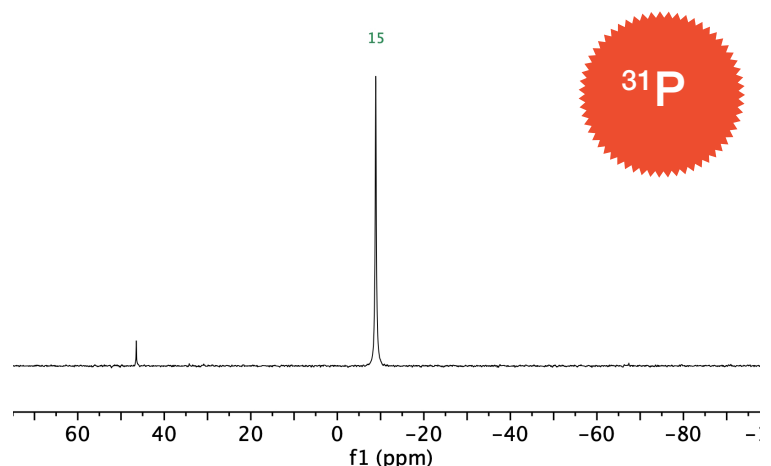
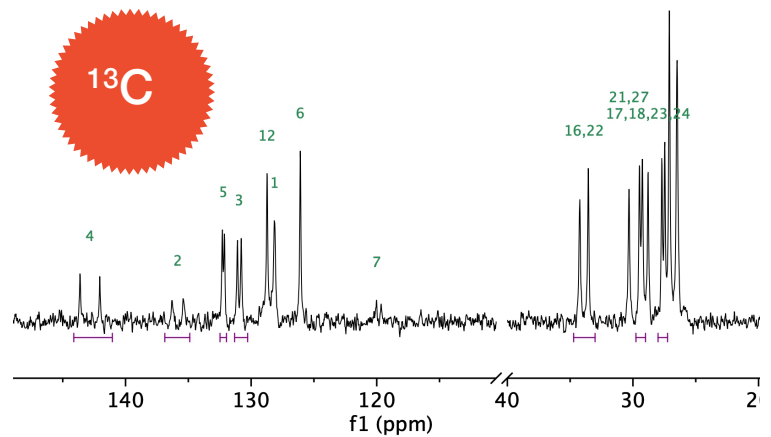
Access multiple nuclei in one NMR spectrometer in a fully automatic way



Benefits of the Spinsolve Multi X

- 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

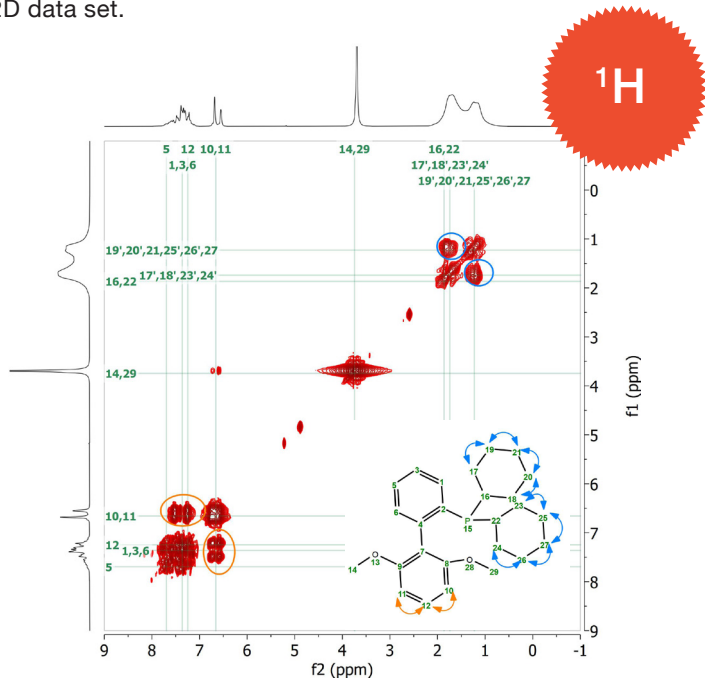
¹³C and ³¹P measured in a Spinsolve Multi X



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

2D COSY

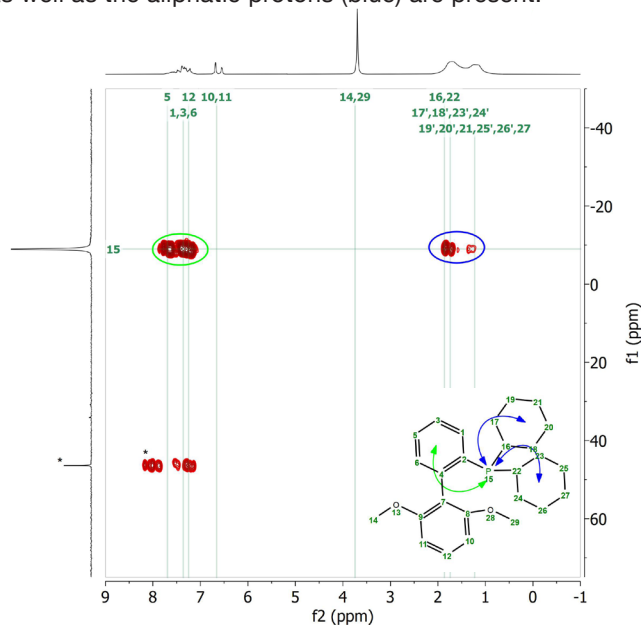
The 2D COSY experiment allows one to identify coupled ^1H nuclei as they generate cross peaks out of the diagonal of the 2D data set.



^1H 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

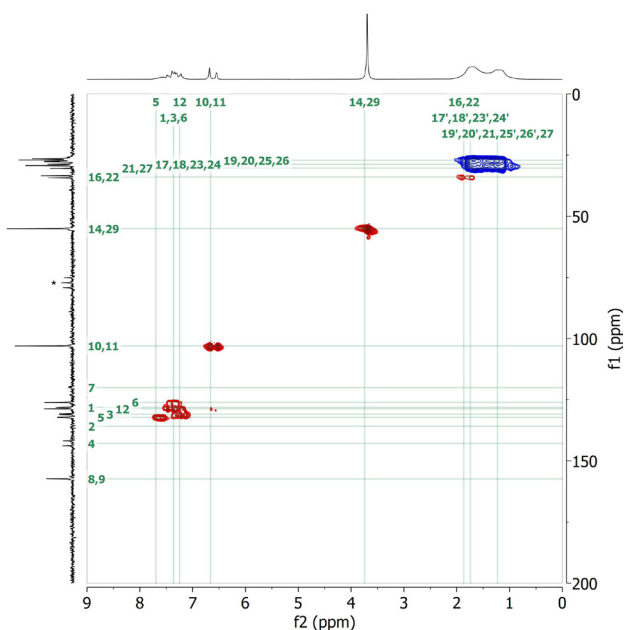
The long-range ^1H - ^{31}P correlations can be observed for the phosphorus atom at position 15. It can clearly be seen that both couplings to the aromatic protons 1, 3, 5 and 6 (green) as well as the aliphatic protons (blue) are present.



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

2D HSQC-ME

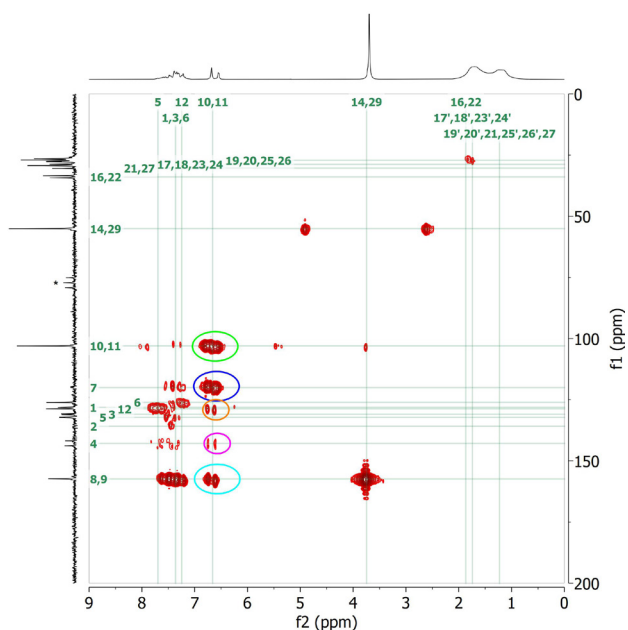
The HSQC is a powerful sequence widely used to correlate the ^1H with the one-bond coupled ^{13}C nuclei.



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

2D HMBC

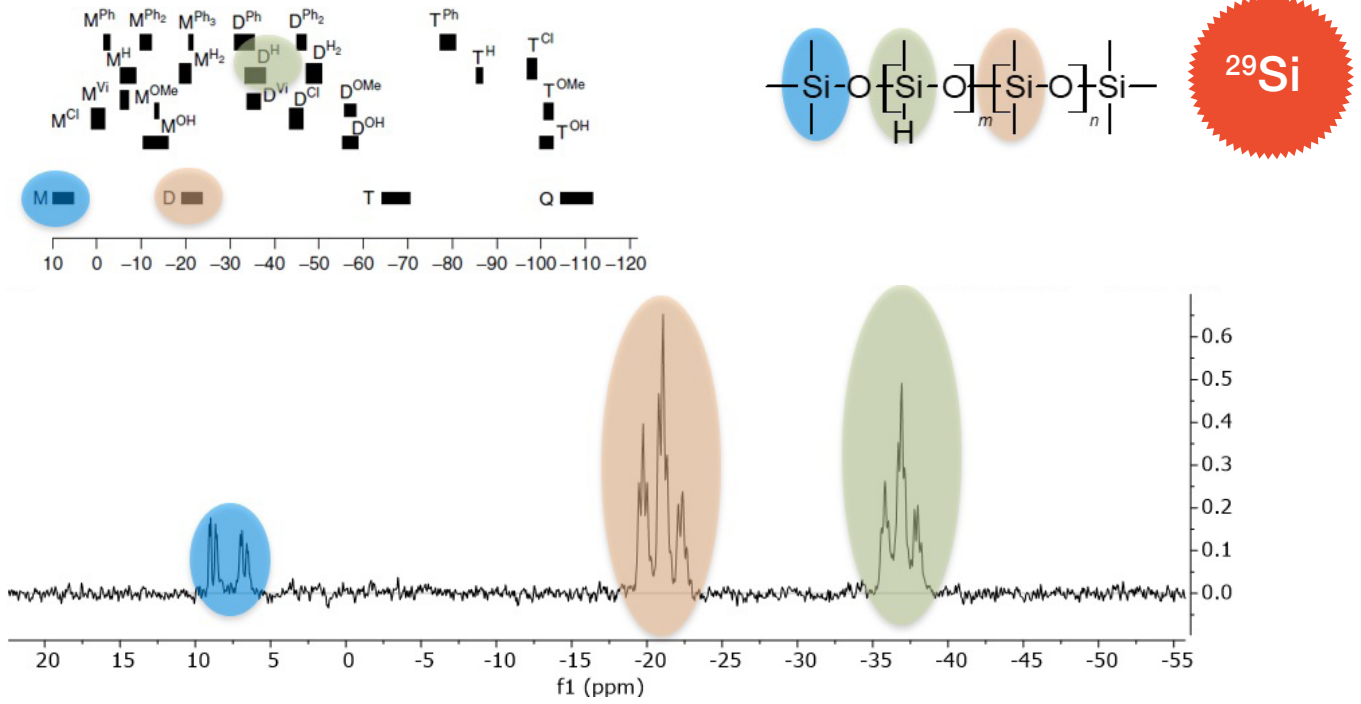
The Heteronuclear Multiple Bond Correlation (HMBC) experiment shows the long-range correlation of protons 10 and 11 with carbons 4, 7, 8, 9 and 12 (the sequence shows the correlation with quaternary carbons, too).



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

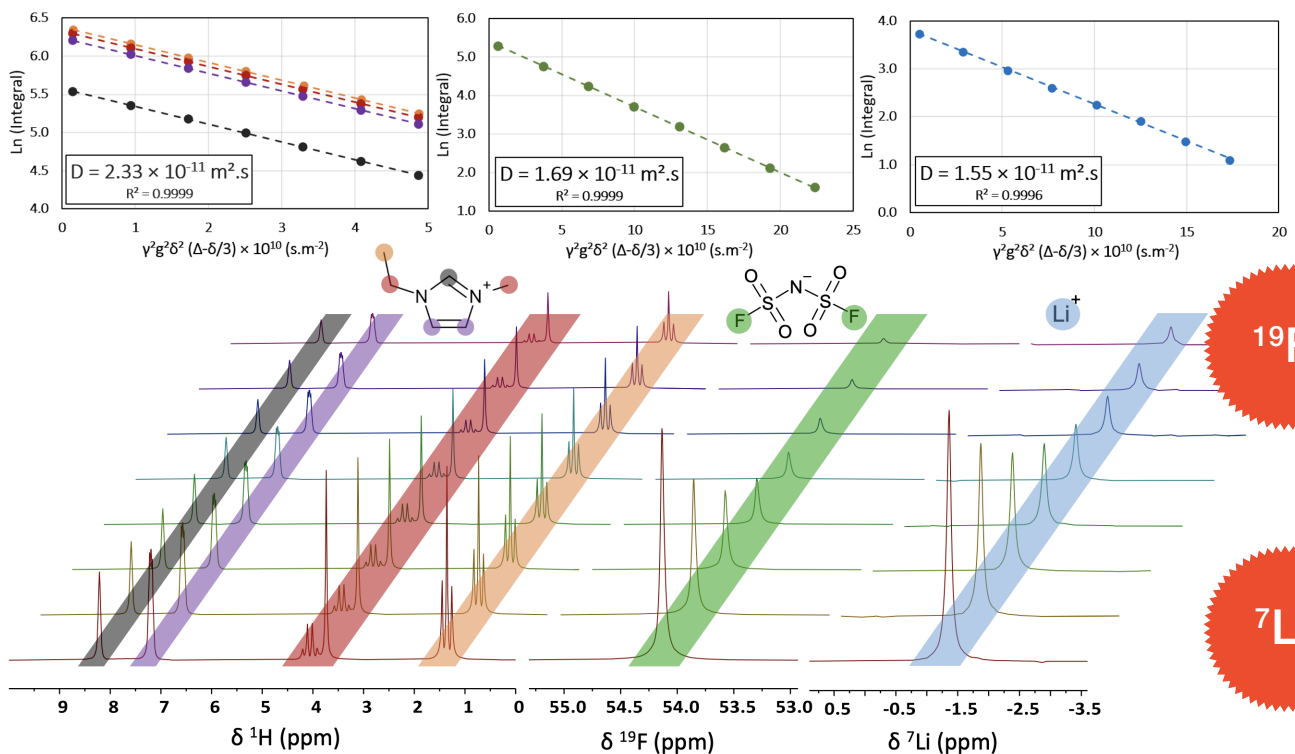
Spinsolve Multi X with ^{29}Si for structural characterization

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.



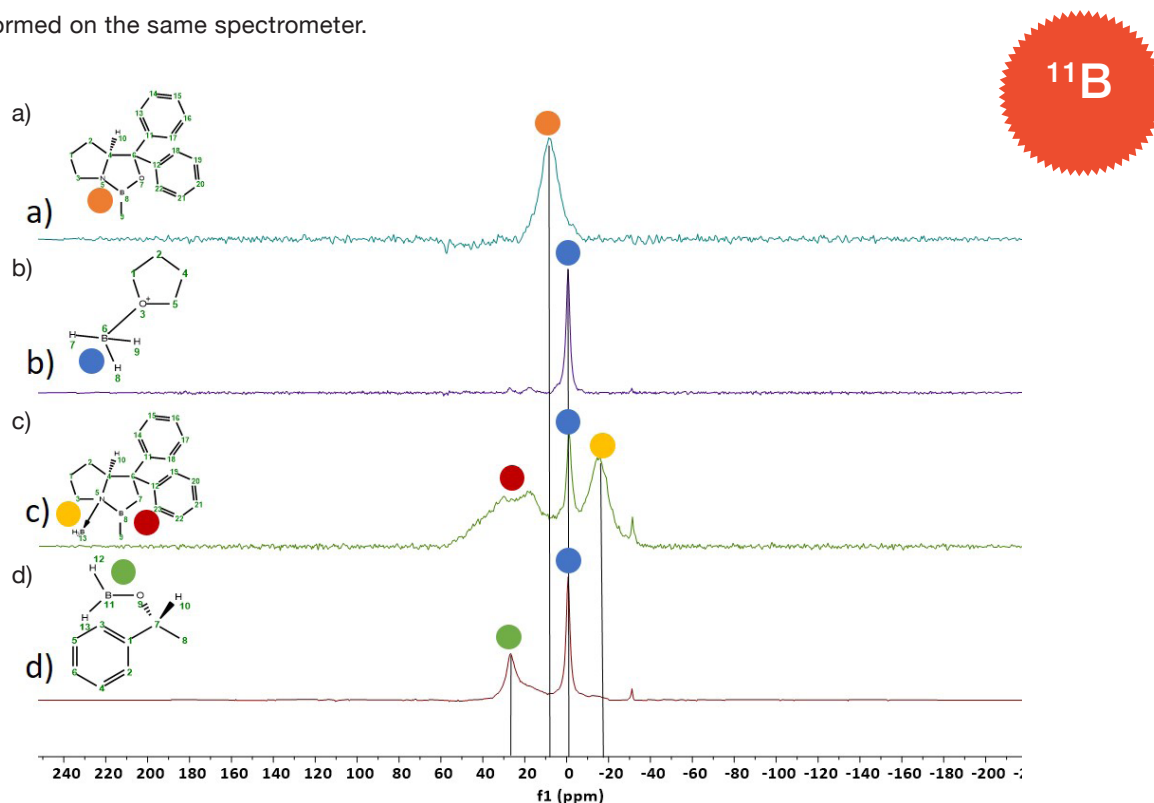
Spinsolve Multi X with optional PFG to measure molecular mobility

Pulsed field gradient (PFG) experiments are useful to assess the molecular mobility of different molecules dissolved in a mixture. By adding a gradient coil to the Spinsolve Multi X you can measure the diffusion coefficient of molecules containing any of the nuclei available on the spectrometer. The example below shows the ^1H , ^{19}F and ^7Li 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 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

- Nuclei: All models measure ^1H and ^{19}F
Optional X nuclei: ^7Li , ^{11}B , ^{13}C , ^{15}N , ^{29}Si , ^{31}P (inquire for other X nuclei)
- Includes a powerful multi-line solvent suppression method
- Includes X-decoupled proton acquisition for all available X nuclei
- Exceptional Linewidth specifications for all models

The high homogeneity of the Spinsolve Multi X is possible due to advances in the patented shimming technology used in the Magritek High Homogeneity Halbach Magnets*

*Patent US 8,148,988 and EP 2,144,076

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

Email: sales@magritek.com

Website: www.magritek.com/contact-us

GERMANY +49 241 9278 7270

UNITED STATES +1 855 667 6835

UNITED KINGDOM +44 7468 529 615

NEW ZEALAND +64 4 477 7096

For a complete listing of our global offices and distributors visit: www.magritek.com/about-us/distributors/