

# Single-Tuned 4mm Cryocoil MAS Probe

A tunable single-tuned 4 mm Cryocoil MAS probe was developed, and demonstrated for  ${}^6\text{Li}$  and  ${}^{29}\text{Si}$  under 14.1 T WB magnet. The sensitivity enhancement factor attained by the Cryocoil MAS probe is 4.4 times compared with the same experimental condition using the conventional probe.

## Typical Specification:

- Detection Coil Temperature: 14 K
- Sample Temperature: 273 - 353 K
- Rotor O.D.: 4 mm (volume: 50  $\mu\text{l}$ )
- Spinning Speed: 18 kHz max.
- Tuning Range: 73 - 192 MHz
- Input Power: 250 W max.



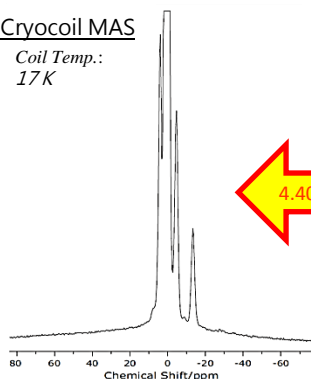
## Sensitivity and RF field strength enhancement by Cryocoil MAS Probe

### ${}^6\text{Li}$ @88.3 MHz

- Sample: 100% labeled  ${}^6\text{LiCoO}_2$  (170 mg)
- Spinning speed: 17.35 kHz
- Sequence: Hahn-Echo ( $\tau = 57 \mu\text{s}$ )
- $\text{Pi}/2$  pulse width: 3.8  $\mu\text{s}$
- Total scan time: 512 s (16 x 32 s)

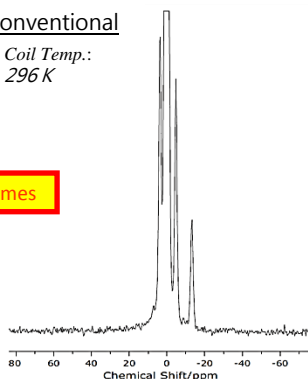
#### Cryocoil MAS

Coil Temp.:  
17 K

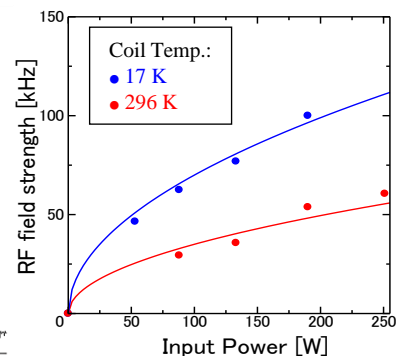


#### conventional

Coil Temp.:  
296 K



4.40 times

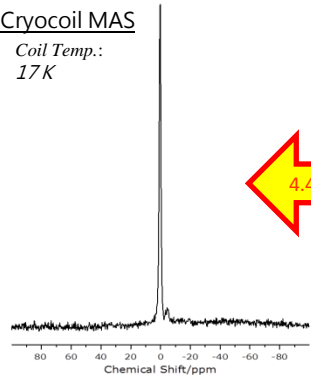


### ${}^{29}\text{Si}$ @118.3 MHz

- Sample: LTA Zeolite (50.6 mg)
- Spinning speed: 16.58 kHz
- Sequence: Hahn-Echo ( $\tau = 60 \mu\text{s}$ )
- $\text{Pi}/2$  pulse width: 4.6  $\mu\text{s}$
- Total scan time: 2250 s (100 x 22.5 s)

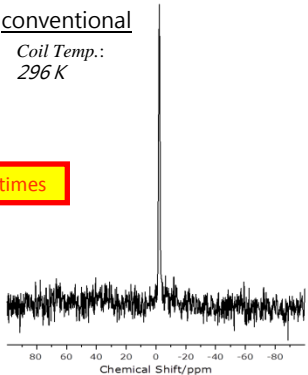
#### Cryocoil MAS

Coil Temp.:  
17 K

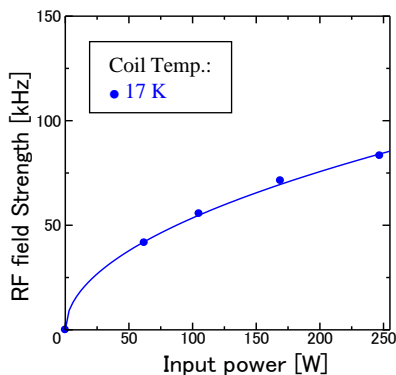


#### conventional

Coil Temp.:  
296 K



4.45 times



T. Mizuno, K. Hioka, K. Fujioka, K. Takegoshi, Rev. Sci. Instrum. 79 (2008), 044706.

T. Mizuno, K. Takegoshi, Rev. Sci. Instrum. 80 (2009), 124702.