

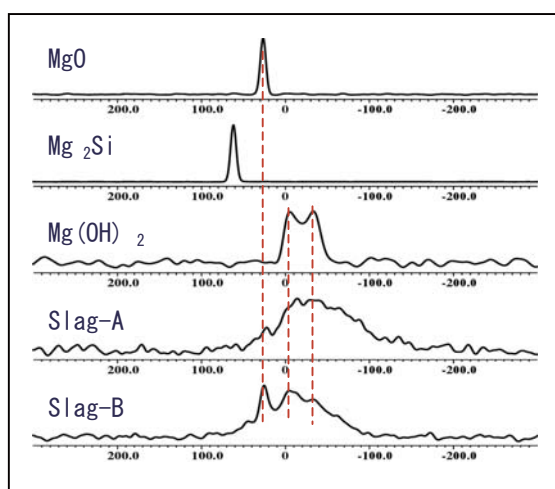
JNM-ECA 4mm MQMAS probe

JEOL Resonance supplies 4mm MQMAS probes suitable for research of inorganic materials.

MQMAS probes can irradiate sufficiently strong RF pulses, necessary for MQMAS measurements, by employing high-voltage balanced resonance circuits, originally developed by JEOL. Also, large volume 4mm rotors of the probes may help to achieve high signal sensitivity.

Solid-state NMR of ^{25}Mg in natural abundance

Figures shown below are spectra of ^{25}Mg , one of low- γ quadrupolar nuclei, demonstrating the effectiveness of the MQMAS probe.

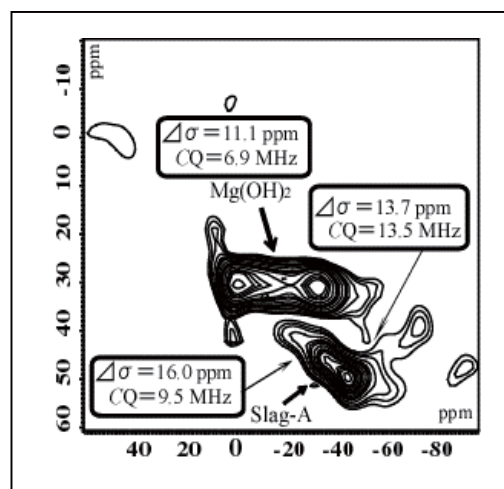


^{25}Mg spectra of inorganic compounds

The individual inorganic compounds were differentiated by ^{25}Mg spectra.

Reference

M. Hatakeyama, T. Nemoto, K. Kanehashi, and K. Saito, Chemistry Letters, 34, 684 (2005): "Natural Abundance Solid-state ^{25}Mg MQMAS NMR Studies on Inorganic Solids at a High Magnetic Field of 16.4 T."



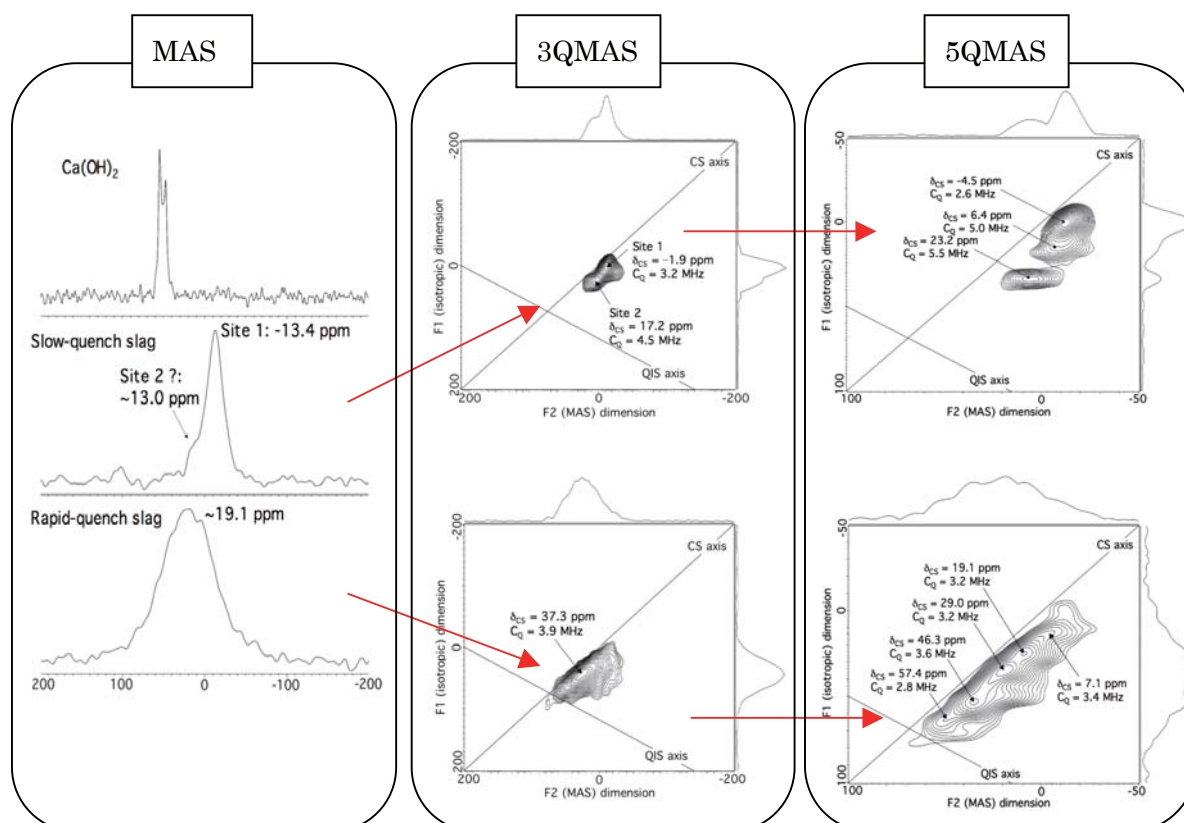
^{25}Mg 3QMAS spectrum of slag

High crystallinity $\text{Mg}(\text{OH})_2$ and amorphous slag-A were found to coexist.

Data are by courtesy of Dr. K. Saito of Nippon Steel Corporation.

Solid-state NMR of ^{43}Ca

^{43}Ca is another low- γ quadrupolar nucleus and plays an important role in organic and inorganic materials. Figures shown below are the spectra of ^{43}Ca -enriched materials. The combination of enrichment technique and MQMAS measurements makes analysis possible.



^{43}Ca spectra of inorganic compounds

MAS spectra (left), 3QMAS spectra (center), and 5QMAS spectra (right) of ^{43}Ca -labeled slags. 5QMAS measurements requiring very short RF pulses allowed detailed analysis.

Reference

- 1) K. Shimoda, Y. Tobu, K. Kanehashi, T. Nemoto, and K. Saito, *Chemistry Letters*, 34, 1588 (2005): "Local Environments of Slags: The First Application of ^{43}Ca 3QMAS NMR Technique."
- 2) K. Shimoda, Y. Tobu, K. Kanehashi, T. Nemoto, and K. Saito, *Solid State Nuclear Magnetic Resonance*, 30, 114 (2006): "First Evidence of Multiple Ca Sites in Amorphous Slag Structure: Multiple-quantum MAS NMR Spectroscopy on Calcium-43 at High Magnetic Field."

Data are by courtesy of Dr. K. Saito of Nippon Steel Corporation.