



ANASAZI NUCLEI SERIES

MULTINUCLEAR NMR SILICON-29

²⁹Si PROPERTIES

- 4.7% natural abundance
- Spin 1/2
- Range of chemical shifts:
825 ppm

DID YOU KNOW?

Silicon, often thought of as inorganic, it is a vital element for many life forms.

Algae (diatoms) convert about six billion metric tons of silicon into silica each year.

Silicon also plays important roles in grasses, trees, and bone.

Despite this, the carbon-silicon (C-Si, organosilicon) bond does not exist in nature. Only in the lab have chemists devised synthetic routes to organosilicons. This has led to silicones, organofunctionalized silanes and other valuable materials. Continued R&D and commercialization has resulted in a wide range of industrial and consumer applications.

In 2016 researchers reported using modified enzymes to catalyze the formation of the C-Si bond. This opens the possibility of using biomolecules to produce commodity and specialty organosilicons rather than toxic or expensive catalysts.

What can you do with ^{29}Si NMR?

Follow the hydrolysis of alkylalkoxysilanes and the subsequent condensation reactions. ^{29}Si NMR differentiates the silanol monomers and the M-structures, D-structures, and T-structures of the oligomers.

^{29}Si PROPERTIES

SPIN:	1/2	FREQ EFT-90:	17.882 MHz
RECEPTIVITY TO ^{13}C :	2.09	REFERENCE STANDARD:	$(\text{CH}_3)_4\text{Si}$
GYROMAGNETIC RATIO:	-8.465 MHzT ⁻¹		

R.K. Harris et.al. *Pure Appl. Chem.*, Vol. 73, No. 11, 2001

RECOMMENDED LITERATURE

H. C. Marsmann in *Encyclopedia of Nuclear Magnetic Resonance*, John Wiley & Sons, Inc., Chichester, 1996; Vol. 7, 4386-4398

E. A. Williams in *The Chemistry of Organic Silicon Compounds*, John Wiley & Sons, Inc., Chichester, 1989; Vol. 1, 511-554