*American Mineralogist, Volume 84, pages 983–986, 1999*

# LETTERS

## Al-O-Al oxygen sites in crystalline aluminates and aluminosilicate glasses: High-resolution oxygen-17 NMR results

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### ABSTRACT

We report $^{17}O$ magic-angle spinning (MAS) NMR data for crystalline $NaAlO_2$ and $CaAl_2O_4$ at external magnetic fields of 9.4 and 14.1 T, as model compounds for Al-O-Al sites in tetrahedral networks. The former contains one peak with isotropic chemical shift ($\delta_{iso}$) = 30.9 ppm and quadrupolar coupling constant ($C_Q$) ≈ 1.8 MHz. The latter contains several peaks with $\delta_{iso}$ ranging from 39 to 87 ppm and $C_Q$ ≈ 1.5 to 2.4 MHz. Triple-quantum MAS (3QMAS) spectra of sodium and calcium aluminosilicate glasses with Si/Al < 1 show clearly resolved peaks for Al-O-Al sites, removing ambiguity in the use of such spectra to explore the extent of aluminum avoidance in both glassy and crystalline materials. We also report $^{23}Na$ and $^{27}Al$ NMR data for the crystalline phases.