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LETTERS

Chloride ion sites in silicate and aluminosilicate glasses: A preliminary study by ^{35}Cl solid-state NMR

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ABSTRACT

Despite the importance of the chloride ion in magmas and the fluids that separate from them, very little is known about atomic-scale structural environments for Cl^- in silicate glasses. We present here the first solid-state ^{35}Cl NMR data for Cl in silicate and aluminosilicate glasses, made possible by the availability of very high (14.1 to 18.8 Tesla) magnetic fields. We find that ^{35}Cl has a wide range in chemical shifts that correlate well with cation-Cl distance and thus contain considerable structural information. In general, Cl is coordinated primarily by network-modifying alkali or alkaline earth cations, and we see no evidence for Al-Cl bonding.