European Mineralogical Conference Vol. 1, EMC2012-512-4, 2012 European Mineralogical Conference 2012 © Author(s) 2012



Al/Si distribution in Eifel Sanidines: first results from neutron diffraction

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Sanidines (K,Na)[AlSi3O8] are alkali feldspars, part of the solid solution series Albite - Orthoclase and their typical composition is in a range between Al35Or65 and Al15Or85. The monoclinic tectosilicate occurs at two different modifications, low- and high-sanidine, mainly differing in their Al/Si distribution. Reordering is usually acquired by long-term-annealing (>1000h) at temperatures of 900°C and above, but with sanidine megacrystals from Eifel it's possible to reach faster Al/Si disordering within short annealing time and starting temperatures around 700°C. To investigate this unusual Al/Si disordering behaviour, we determined the Al/Si distributions of Sanidine samples from different locations around the Eifel volcanic region by a direct method. Neutron diffraction experiments at the high resolution neutron diffractometer (E9) at the Berlin Research Reactor BERII were performed to determine the site occupancies of the tetrahedral sites. Due to nearly similar atomic scattering factors of Al3+ and Si4+, it is not possible to determine Al/Si distribution using X-ray diffraction. We are able to avoid this problem by doing structural analysis by Rietveld refinement of neutron diffraction data, which allows separation of these kind of isoelectrical ions.

We want to present and discuss the first results on the Al/Si distribution in sanidines around the Eifel volcanic region, comparing untreated samples and samples annealed at 1050°C for 24h.