The measured parameters and the two sigma errors in \( \AA \) are:

\[
\begin{align*}
\text{Na}_2\text{O}_3 & : \\
 a &= 14.1757 \pm 0.0057 \\
b &= 3.6262 \pm 0.0014 \\
c &= 8.8502 \pm 0.0033 \\
\beta &= 100.056 \pm 0.0347 \\
x_\text{A} &= 7.798 \pm 0.005 g \text{ cm}^{-3} \\
x_\text{B} &= 7.498 \pm 0.005 g \text{ cm}^{-3}
\end{align*}
\]

\( \text{K}_2\text{O}_3 \) 

\[
\begin{align*}
 a &= 14.1088 \pm 0.0058 \\
b &= 3.6020 \pm 0.0013 \\
c &= 8.8051 \pm 0.0027 \\
\beta &= 100.063 \pm 0.0031 \\
x_\text{A} &= 7.498 \pm 0.005 g \text{ cm}^{-3} \\
x_\text{B} &= 7.498 \pm 0.005 g \text{ cm}^{-3}
\end{align*}
\]

\( \text{Na}_2\text{O}_3 \) irradiated \( \text{K}_2\text{O}_3 \)

\[
\begin{align*}
 a &= 14.1083 \pm 0.0073 \\
b &= 3.6018 \pm 0.0013 \\
c &= 8.7988 \pm 0.0042 \\
\beta &= 100.042 \pm 0.041 \\
x_\text{A} &= 8.306 \pm 0.003 g \text{ cm}^{-3}
\end{align*}
\]

New monoclinic europia swells when it is irradiated under these conditions by ~5%. Since the crystal lattice parameters do not change it is clear that the swelling owes its origin entirely to vacancy clustering as already observed by Pearce J H, in ULAKE AERE Report 10116 pp 42-43.

The lattice parameters for the unirradiated oxides should be compared with other determinations for the samaria-gadolinia binary system (Ferguson J F, Acta Cryst. A31 (3) (1975) 369).

It is also interesting to compare these results with those obtained for NaO2-stabilised face centred cubic europa irradiated under the same conditions. There the lattice parameter expanded from 5.3704 \pm 0.0008 to 5.3745 \pm 0.0010 corresponding to an increase in length of 0.075 (Rayton A, in ULAKE AERE Report 10116 p 44).

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**08.2-13 THE AVERAGE STRUCTURE OF \( \text{Na}_2\text{O}_3\)[\( \text{Al}_4\text{Si}_4\text{O}_{12}\)]**, AN ALKALI-DEFICIENT COMPOSITION BASED ON A FRAMEWORK WITH CRISTOBALITE TOPOLOGY. By M. Gregorkiewitz, Instituto de Fisica-Quimica Mineral, CSIC, Madrid, Spain.

Clear octahedral crystals with composition close to \( \text{Na}_2\text{O}_3\)[\( \text{Al}_4\text{Si}_4\text{O}_{12}\)] were grown at 850-1000°C from a mixture of the oxides in fused KF.

Powder diagrams including back-reflections and internal Si standard, as well as Weissenberg photographs (Okita, spot and integrated reflections) for 11 crystals from 4 different syntheses led invariably to the cubic diffraction symmetry \( \text{R}3\text{m}(\text{subcell}) \), corresponding to space group \( \text{Fd}3\text{m} \) with \( \omega=765(2) \) pm and \( \Delta=4 \). The observed density is 2.603(5) \( \text{g cm}^{-3} \). With the assumption of the oxides in fused KF, the coordination sphere was \( \text{Na}^{+} = 0.1 \), as suggested from the optical behaviour. For the internal behaviour and peak widths in 26 with occasional splitting of back-reflections, occurs possibly with random distribution of Na and Si. The oxygen atoms lie statistically on one of six sites at \( 0,0,0 \) and \( 0.16,0,0 \) with \( 0.16,0,0.16 \) for the assumed symmetry and without appreciable differences for the three samples.

Symbolic addition gave the positional parameters for all atoms, with T=\( \text{Si} \) at \( 0.0,0.0,0.0 \), statistically at \( 0.0 \), and \( 0.16 \) at \( 0.16,0,0.16 \). In the 26 reflections of the 4\( n \), 4\( n \), 4\( n \), 2\( n \) reflections and has been interpreted as an additional site for the oxygen. During refinement, several constraints have been applied concerning the repartition of the oxygen and the representation of oxygen either by anisotropic thermal motion or processing about the T-T line.

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**08.2-14 K- AND Rb-EXCHANGED NEPHELINE HYDRATE** I. By Staffan Hansen and Leif Fählin, Inorganic Chemistry 2, Chemical Center, University of Lund, P.O. Box 746, S-220 07 Lund, Sweden.

The crystal structures of the K\(^+\) - and Rb\(^+\) -exchanged forms of the microporous framework silicate nepheline hydrate \( \text{Na}_2\text{Si}_2\text{O}_5\text{H}_2\text{O} \) were refined in space group \( \text{Pm}2_1 \) to \( R = 0.032 \) and \( R = 0.048 \), respectively, using single crystal X-ray diffraction data. Lattice constants: \( a = 8.113(3), b = 15.223(2), c = 5.1817(5) \) \( \text{Å} \) for K\(^+\) and \( a = 8.0802(8), b = 15.255(2), c = 5.1584(5) \) \( \text{Å} \) for Rb\(^+\). Compositions of \( \text{K}_2\text{Na}_2\text{Si}_2\text{O}_5\text{H}_2\text{O} \) and \( \text{RbNa}_2\text{Si}_2\text{O}_5\text{H}_2\text{O} \), \( S = 2 \) were indicated by the least-squares refinement.

Both structures contained two \( \text{Na}^+ \) ions which were but little affected by the ion-exchange process, a behaviour that is also exhibited by \( \text{CsNH}_4 \) (Hansen and Fählin, Z. Kristallogr. 1963, 126, 79). The two \( \text{Na}^+ \) sites, coordinated by 7 framework O atoms were situated in a void built of 6-rings.

In the 8\( n \) channels the exchange was complete, K\(^+\) and Rb\(^+\) occupied similar sites in the vicinity of an elongated 8\( n \) ring. In K\(^+\) the coordination sphere was completed by two symmetry-related water molecules, a situation which was probably paralleled in Rb\(^+\).

The main difference between the two structures was that K\(^+\) had a second cation in the 8\( n \) tunnel. This K\(^+\) ion provided the necessary charge compensation for the 3% vacancy in one of the Na sites.