08.2-03 NEW SILVER(I)-BORATES. By Martin Jansen, Justus Liebig-Universität, 6300 Gießen, Heinrich-Buff-Ring 56, FRG.

Silver(I)-oxides with a high ratio cations/oxygen show unusual structural features with respect to the arrangement of Ag⁺. The positively charged silver cations aggregate to form cluster-like agglomerates with Ag-Ag distances in the same order of magnitude as those in metallic silver (Jansen, J.Less-Common Metals, 1980, 76, 285). This tendency causes formation of special crystal structures which are not isostructural to those of ternary alkalioxides of respective composition. By synthesis and investigation of new silver(I)-borates we can demonstrate that these findings hold for the pairs Na₃BO₃/Ag₃BO₃ and Na₂B₆O₁₁/Ag₂B₆O₁₁, too.

Ag₃BO₃ (Jansen, Scheid, Z.Anorg.Allg.Chem., in press) is dimeric (Jansen, Brochtel, to be published). Both modifications as well as Ag₃BO₃ (Brochtel, Jansen, Z.Anorg.Allg.Chem., in press) have been prepared by solid state reaction of the binary components using elevated oxygen pressures (p(O₂) > 1500 bar). The crystal structures of Ag₃BO₃(I) and Ag₃BO₃(II) are identical with respect to the silver positional structures, whereas the linkages of Ag₆- and BO₆-polyhedra is completely different. Ag₃BO₃ contains instead of the expected cyclo-trimetaborate-anions a BO₆-isopolyanion with boron coordinated in equal parts tetrahedrally and trigonal-planar by oxygen.

08.2-04 THE CRYSTAL STRUCTURE OF THE FOURTEEN LAYER POLYTYPE OF BaCrO₃. By Lewis Katz and Bertrand L. Chamberland, Department of Chemistry and Institute of Materials Science, University of Connecticut, Storrs, CT 06268, USA.

The title compound, prepared at 1300°C and 60-65 kbar by reaction of Cr₂O₃ and Ba₂CrO₄ as one of a mixture of products, crystallizes in space group P6₃/mmc, a = 5.649 ± 0.002 A, c = 32.461 ± 0.005 A. The structure was determined from 346 independent, observed, reflections collected by a Siemens automatic counter method and refined by least squares to a conventional R of 4.1%.

The fourteen layer stacking sequence of close packed BaO₃ layers in Zhdanov notation is [2(3)2][2(3)2]. All 0₆ octahedral sites are occupied by Cr. Despite the different repeat distances, the fourteen layer is structurally closely related to the four, six, and twenty-seven layer polytypes, and all are stoichiometric. These polytypes differ from the twelve layer barium chromium oxide in both structural features and composition.

08.2-05 SYNTHESIS OF Sr₂Ba₂B₄O₁₂, COMPOUND WITH K₂NiF₆-TYPE STRUCTURE. By C. Moure Jiménez, Instituto de Cerámica y Vidrio, Madrid, Spain.

The three-oxide compounds with perovskite structure have been studied in many works. In these compounds B' and B'' are two cations with small ionic radii and different valence states.

In the present work three-oxide compounds with K₂NiF₆ structure (derived from perovskite structure) were synthesized. The cations were pentavalent Nb and Ta, and divalent Ni and Co. The starting raw materials were high-purity oxides and carbonates. The compounds were prepared by solid-state reaction of the appropriate components. The temperature range was 1000-1600°C for several periods of time, in air atmosphere.

The samples were examined by X-ray diffraction at room temperature. The powder diffraction patterns were indexed, and the lattice constants for the different synthesized compounds were calculated.

Four new compounds (Sr₂Nb₂NiO₁₂, Sr₂Co₂NiO₁₂, Sr₂Ta₂NiO₁₂, Sr₂Co₂CoO₁₂) were identified. All of them are unstable, and decompose above 1600°C. In some cases (Co compounds), intermediate structures between perovskite and K₂NiF₆-structures appeared in the whole temperature range studied.

08.2-06 CRYSTAL STRUCTURE OF TRIBURIDIO KePTABROMO-DIMANGANATE. By E.M. Ati, Faculty of Education, Khartoum University, Sudan. J. Goodyear and H.H. Sutherland, Department of Physics, Hull University, England.

Rb₃MgBr₁₇ tetragonal, I4/mmm, a = 5.37 (7), c = 27.80 (5) Å, Dₐ = 3.80, Dₚ = 3.84 Mg m⁻³, Z = 2. The final R is 0.059 for 139 visually estimated reflections. MgBr octahedra shares five vertices with the neighbouring octahedra to form layers of perovskite-type structure, two unit-cells thick, parallel to (100), alternate layers being displaced by a distance a/2 in the [100] direction. Br ions at the unshared vertices are linked to the Br⁻ ions in the adjacent layer of perovskite structure such that each Br⁻ ion is coordinated by nine Br⁻ ions. The Rb(2) ions lie within the layers and each is coordinated by 12 Br⁻ ions. The structure is strictly isomorphous with that of Sr₃Ni₂O₇.