08.2-03 NEW SILVER(I)-BORATES. By Martin Jensen, Justus Liebig-Universität, 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 particles 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 alkali-lodides of respective composition. By synthesis and investigation of new silver(I)-borates we can demonstrate that these findings hold for the pairs Na\(_3\)BO\(_3\)/Ag\(_3\)BO\(_3\) and NaBO\(_2\)/AgBO\(_2\), too.

Ag\(_3\)BO\(_3\) (Jansen, Scheld, Z. Anorg. Allg. Chem., in press) is dimorphic (Jansen, Brachtet, to be published). Both modifications as well as AgBO\(_2\) (Brachtel, Jansen, Z. Anorg. Allg. Chem., in press) have been prepared by solid state reaction of the binary components using elevated oxygen pressures (P\(_{O_2}\) > 1500 bar). The crystal structures of Ag\(_3\)BO\(_3\)(I) and Ag\(_3\)BO\(_3\)(II) are identical with respect to the silver polyhedral structures, whereas the linkages of Ag\(_6\)- and BO\(_3\)-polyhedra is completely different. AgBO\(_2\) contains instead of the expected cyclo-trimetaborate-anions \(\text{AgBO}_3\)-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 BaCr\(_2\)O\(_4\). 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 Cr\(_2\)O\(_3\) and Ba\(_2\)Cr\(_2\)O\(_7\) as one of a mixture of products, crystallizes in space group P6\(_3\)\(/mmc\), \(a = 5.649 \pm 0.002\), \(c = 32.461 \pm 0.005\) Å. The structure was determined from 346 independent, observed, reflections collected by automated counter methods and refined to least squares to a conventional R of 4.1%.

The fourteen layer stacking sequence of close packed Ba\(_2\) layers in Zhdanov notation is [2[3][2][2][3][2]]. All O\(_6\) 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 Sr\(_2\)B\(_3\)O\(_3\)I\(_3\)/Sr\(_2\)B\(_3\)O\(_3\). COMPOUND WITH K\(_2\)NiF\(_4\)-TYPE STRUCTURE. By C. Moor, 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 K\(_2\)NiF\(_4\)-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 (Sr\(_2\)Nb\(_2\)O\(_7\), Sr\(_2\)Co\(_2\)O\(_7\), Sr\(_2\)Ta\(_2\)O\(_7\)), and Sr\(_2\)Co\(_2\)O\(_7\)) were identified. All of them are unstable, and decompose above 1400°C. In some cases (Co compounds), intermediate structures between perovskite and K\(_2\)NiF\(_4\)-structures appeared in the whole temperature range studied.

08.2-06 CRYSTAL STRUCTURE OF TRIRUBIDIUM HEPTABROMO-DIMANGANE. By E.M. Ali, Faculty of Education, Khartoum University, Sudan. J. Goodyear and H.H. Sutherland, Department of Physics, Hull University, England.

The title compound, prepared from Rb\(_2\)Mn\(_2\), \(\gamma\)-tetragonal, I4/mmm, \(a = 5.37\) (2), \(c = 27.80\) (5) Å, \(D_\text{m} = 3.80\), \(D_\text{p} = 3.84\) Mg m\(^{-3}\), \(Z = 2\). The final R is 0.059 for 139 visually estimated reflections. Mn\(_{13}\)Br\(_7\) 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\(_7\) ions at the unshared vertices are linked to the Br\(_7\) ions in the adjacent layer of perovskite structure such that each Br\(_7\) ion is coordinated by nine Br\(_7\) ions. The Br\(_7\) ions tie within the layers and each is coordinated by 12 Br\(_7\) ions. The structure is strictly isomorphous with that of Sr\(_3\)Ti\(_2\)O\(_7\).