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# Abstracts of Forthcoming Articles

*Accommodation of Oxygen Loss in $WO_3$ Equilibrated With CO + $CO_2$ Buffers.* SVEN BERGLUND AND WUBESHET SAHLE, Department of Inorganic Chemistry, Arrhenius Laboratory, University of Stockholm, S-106 91 Stockholm, Sweden. Tungsten trioxide reduced at about 1270 K by means of controlled atmospheres ($P_{O_2} = 3.7 \cdot 10^{-8}$ to $1.7 \cdot 10^{-13}$ atm) was studied by high-resolution transmission electron microscopy, electron diffraction, and X-ray powder diffraction. The accommodation of oxygen loss in the parent $WO_3$ lattice in the range $WO_3$ to $WO_{2.72}$ was clarified. The results indicate a solid-state mechanism. Intergrowth has been found to take place between several of the structural types that occur in this composition range. The intergrowth features include directional changes in shear plane arrays ("swinging shear planes"). Details of the structural variation with the oxygen content are reported. Ordered shear planes on {102} directions were found to stabilize the orthorhombic $WO_3$ parent lattice at room temperature. $W_{24}O_{68}$ has been prepared in a fairly well-defined state.

*Structure and Properties of the New Phase of the Pseudo-One-Dimensional Compound $TaS_3$.* A. MEERSCHAUT, L. GEUMAS, AND J. ROUXEL, Laboratoire de Chimie des Solides, Université de Nantes, 2, rue de la Houssiniere, 44072 Nantes Cedex, France. The structure of a new form of tantalum trisulfide has been determined from single-crystal X-ray diffraction data and refined to an $R$ value of 0.025. The unit cell is monoclinic with space group $P2_1/m$: $a = 9.515(2)$ Å, $b = 3.3412(4)$ Å, $c = 14.912(2)$ Å, $\beta = 109.99(2)°$. The structure consists of sulfur triangular prisms stacked on top of each other by sharing triangular faces. The tantalum atoms are located close to the center of the prisms which are parallel to the $b$ twofold axis. The prisms are linked together in the $c$ direction to form slabs parallel to the $b$–$c$ plane. This arrangement is very like that observed in $NbSe_3$. The physical properties, especially the metal–semiconductor transition at 210 K, are discussed according to the structural features such as metal–metal distances and the existence of different S–S pairs.

*High n-Value Phases in the Complex Bismuth Oxides with Layered Structure, $Bi_2CaNa_{n-2}Nb_nO_{3n+3}$.* KUNITAKA MURAMATSU, MASAJI SHIMAZU, JUNZO TANAKA, AND SHIGEO HORIUCHI, National Institute for Research in Inorganic Materials, Sakuramura, Niihari-gun, Ibaraki 305, Japan. Complex bismuth oxides with layered structure are prepared with a series of compositions in the system $Bi_2CaNb_2O_9$–$NaNbO_3$. It is found by X-ray powder diffraction that each compound is composed of more than two phases, which are described by the formula $Bi_2CaNa_{n-2}Nb_nO_{3n+3}$; e.g., in the sample with the nominal composition $Bi_2CaNb_2O_9 \cdot 8NaNbO_3$; the phases with $n = 6$ to 8 appear predominantly. These phases are closely intergrown with each other. Moreover, high-resolution electron microscopy reveals that microsyntactic intergrowth frequently occurs in the phases with $n > 5$. The occurrence of the latter intergrowth is explained in terms of the bond length obtained.

*Electron Microscope Observation of Lattice Defects in the Fe–Cr σ-phase.* TSUTOMU ISHIMASA, YASUYUKI KITANO, AND YUKITOMO KOMURA, Department of Materials Science, Faculty of Science, Hiroshima University, Higashi-senda-machi, Naka-ku, Hiroshima 730, Japan. The lattice image of the Fe–Cr σ-phase was observed by high-resolution electron microscopy with the $c$ axis of the tetragonal cell parallel to the incident beam. It was found that bright dots of the observed image correspond to the positions of atoms in the $z = \pm\frac{1}{4}$ planes of the σ-phase structure. Sequence faults were found in the irregular part of the lattice image. The analysis of the faults shows that an extra plane of $\frac{1}{2}a_0$ width is inserted into the regular structure and one side of the fault is slightly shifted parallel to the fault plane with respect to the other side, which is consistent with the model proposed by Frank and Kasper. A unit cell step of the sequence faults was found and a model of the step was proposed.

*Phase Relations in the Sn–W–O Ternary System near to $WO_3$.* THOMMY EKSTRÖM, M. PARMENTIER AND R. J. D. TILLEY, School of Materials Science, Bradford BD7 1DP, W. Yorkshire, United Kingdom. Phase relations in the Sn–W–O system for compositions near to $WO_3$ and temperatures up to 1173 K have been determined by electron microscopy and X-ray diffraction. The phase limits for the bronzes previously reported in this system have been determined. For the orthorhombic I bronzes the