05.2-12 THE CRYSTAL STRUCTURES OF QUASI ONE-DIMENSIONAL CONDUCTORS OF THE BASIS OF TETRASELENIUM TETRACENE (TSC) AND TETRASELENIUM TETRACHROMENE (TSCF) WITH INORGANIC ANIONS. By R.P. Shibaeva and V.P. Kaminskii, Institute of Chemistry, Physics, USSR Academy of Sciences, 142 432 Chernogolovka, U.S.S.R.

We have carried out the X-ray analyses of the new cation-radical salts such as TSC+Br2-, TSC+(CuBr2)2-, TSC2+(Hg2Br6)2- and also the cation-radical salts formed in the reaction of TSC (TSCF) with HgX2 (X=Br, Cl) [1-3]. Some of these salts have rather high values of conductivity at room temperature, $6 \times 10^{-3}$ ohm$^{-1}$cm$^{-1}$. As distinct from the isostructural complexes TTT+TCN02 and TSC+TCN02, the crystals TSC+Br2-, (CuBr2)2- and TSC+(CuBr2)2-, are not isostructural. The important feature of TTT+CuBr2- structure is the presence of cation-radical stacks with the alternate interplanar TTT-TTT spacings of 3.24 and 3.63Å. The anion in this structure is in the form of a centro-symmetric dimer (CuBr2)$^2$-. The existence of segregate regular stacks of TSC+ with interplanar distance of 3.55 Å is characteristic of TSC+CuBr2- structure. The anion of this structure is the presence of neutral molecules. The crystal structures and electrical properties of the salts in question and all presently well known organic quasi one-dimensional conductors on the basis of TTT and TSCF are analyzed.


05.2-13 THE ROLE OF STRUCTURE ON SUPERCONDUCTIVITY OF A15-SUPERCONDUCTORS. By E.Girgis, Institut für Kristallographie und Petzographie der ETHZ, 8092 Zürich, Switzerland.

A15-compounds have been known to have by far the most favourable structure for the occurrence of superconductivity. The relationship between the superconducting transition temperature (Tc) and the number of electrons/atom as well as cell constants will be discussed. (B.T. Hatchas, Phys.Rev. (1953) 92, 874; D.U. Culpser, H.B. Ort & E.Girgis, Phys.Rev. (1979) B19, 199). Further, the long range order (LRO) and Tc dependence will be treated in detail. The LRO parameter is dependent on heat treatment and stoichiometry and is greatly affected by neutron and ion bombardment. Clarification of discrepancies and contradictions in the literature will be attempted (E.C. Blaughfer et al., J. Low Temp.Phys. (1969) 3, 539; P.B. Wang & J.R. Holden, Solid State Commun. (1974) 14, 443).


And last: how can the max. Tc-values be reached?

A review of the literature and our own results will be presented.

05.2-14 PREMARTENSTIC STATES IN ORDERED Cu$_{68}$Zn$_{17}$Al$_{17}$ ALLOY. By A.A. Katsnelson and N.A. Khatanova. Faculty of physics, Moscow State University, Moscow, USSR.

Studies of crystal structure of quenched Cu$_{68}$Zn$_{17}$Al$_{17}$ alloy employing electron diffraction show that a type of martensitic structure depends on solid solution ordering. If the solid solution is ordered according to Fe$_5$Al (DO$_3$) type, then M18R martensite is formed (Chakravorty, Wayman, Acta Met. (1977) 25, 898). If the ordering is of CsCl (B2) type, then in the same alloy 2H martensite with a distorted martensite isformed. The formation of different martensites in this alloy is the result of different acoustic phonons' "softening", which takes place prior to the martensitic transformation. At this stage electron diffraction study shows the existence of short diffuse streaks, passing through the matrix reflections. If the matrix is ordered like DO$_3$, the streaks run along <110*$>, but if the ordering is like B2 - the streaks run along <112*$>. These streaks can be caused by "softening" of different acoustic phonons' modes in DO$_3$ and B2 solid solution before the transformation. We believe that DO$_3$ - M18R transition begins with "softening" of (110)<110* acoustic mode, while B2 - 2H transition needs the "softening" of <112><111> acoustic mode.