ment with interconfigurational transitions 4f–5d permitted by Laport's rule.

Study of electrical conductivity in the range of 300–1000 K has shown the dependence of $\sigma(T)$ in the process of the first heating to differ from the monoexponential one, as it has been stated above: $TK\sigma$ decreases in the range of 710–830 K and goes further to zero or reverses its sign. It should be stressed that $\sigma(T)$ topography do not depend on type or concentration of activator ion. All of the studied crystals have been found to possess similar characteristic parameters of the real charge transfer in $(Y, TR)_3Al_5O_{12}$ (starting temperature for the fast growth of σ, temperature range of changes $TK\sigma$, values of activation energy of conduction).

It wholly eliminates the idea of determining influence of type and valence of the activator ion on charge transfer processes, so the results obtained should be interpreted as follows. The dependence $\sigma(T)$ of YAG crystals and of solid solutions based on these garnets is thought to be determined by structural defects common for the garnet lattice. This approach makes one consider rational the observed differences in σ values and in sign and values of $TK\sigma$ in "anomalous" region as well as the absence of dependencies between $TK\sigma$ and ion-activator concentrations.

We consider the deviation of $\sigma(T)$ dependency from the exponential law to be caused by a process of recombination of charge carriers with oxigen vacancies.

11.2–3 X-RAY CHARACTERIZATION OF STACKING FAULTS IN CUBIC ZnS CRYSTALS GROWN FROM THE VAPOUR. By M.T. Sebastian and P. Krishna, Physics Department, Banaras Hindu University, Varanasi-221005, India.

An X-ray diffraction study is made to determine the nature of stacking faults present in vapour grown cubic ZnS crystals as well as cubic crystals obtained by solid state transformation from the 2H phase by thermal annealing. For this the point intensity distribution along the 10.L reciprocal lattice row of both kinds of disordered cubic (3C) crystals was recorded on a single crystal diffractometer. The observed intensity profiles are found to be asymmetrically broadened and do not show peak shifts indicating that stacking faults present in both as-grown and annealed crystals are predominantly twin faults distributed randomly. The experimentally obtained intensity profiles agree with those calculated theoretically for a random distribution of twin faults.

This experimental result is in accordance with the following model of the 2H-3C transformation. The transformation commences with the random nucleation of deformation faults in the 2H structure creating a large number of 3C nuclei within the 2H phase. These nuclei then grow further by non-random insertion of deformation faults occurring preferentially at two-layer separations. Since the cubic nuclei can have two twin orientations, the end product of the transformation is a heavily twinned cubic structure.

11.2–4 THE CRYSTAL STRUCTURE OF VANADIUM DITELLURIDE, $V_{1+x}Te_2$. By K.D. Bronsema, G.W. Bus and G.A. Wiegers, Laboratory of Inorganic Chemistry, Materials Science Centre of the University, Nijenborgh 16, 9747 AG Groningen, The Netherlands.

Vanadium ditelluride, $V_{1+x}Te_2$ ($0.04<x<0.11$) has a $Cd(OH)_2$ type structure with unit cell dimensions $a_h = 3.638$ Å and $c_h = 6.582$ Å above the transition temperature T_t of 482 K (for $x \approx 0$). Below T_t the structure is monoclinic, spacegroup C2/m, with cell constants $a_m = 18.984$ Å ($\approx 3a_h\sqrt{3}$), $b_m = 3.5947$ Å ($\approx a_h$), $c_m = 9.069$ Å ($\approx \sqrt{(3a_h^2 + c_h^2)}$), $\beta = 134.62°$. In this low-temperature form the vanadium atoms form double zig-zag chains with V-V distances of 3.316 Å, causing the Te lattice to be distorted. Due to the simultaneous occurrence of the distortion of the $Cd(OH)_2$ type structure of $V_{1+x}Te_2$ in three equivalent directions, complex diffraction patterns are observed. Similar patterns were found for the Nb and Ta ditellurides (Van Landuyt et al., phys. stat. sol., 41, 271 (1970)).

11.2–5 THE DEFECT STRUCTURE OF DOPED PbTe. By M. Schenk, Department of Crystallography, Section of Physics, Humboldt University of Berlin, Invalidenstr. 43, DDR-1040 Berlin, German Democratic Republic.

In PbTe, a narrow-gap semiconductor, doping seems to cause a complex defect structure, at least in some cases. Thereby the electrical activity of the dopants is influenced. In and Bi act as donors, Tl as an acceptor, while Ag should act as an acceptor (Aleksandrov et al., Kratkie soobščeniya po fizike No.7 (1981), 35–41). Point defects due to non-stoichiometry - e.g. lead vacancies in the case of p-type material, and tellurium vacancies and/or lead interstitials at the metal-rich side of the stability region, respectively - also cause an increase of the carrier concentration.
The results of precision lattice parameter, carrier concentration, and dopant concentration measurements show decreasing lattice constants due to increasing dopant concentrations of Bi, In, and Tl. That may be comprehensible for Bi^{3+} and In^{3+}, respectively, because of their small cation radius (compared with that of Pb^{2+}), and according to their lattice relaxation, but it is not intelligible in the case of the big Tl^{+} ion, if there is not considered the formation of an association of Tl with a vacancy.
Ag increases the lattice parameter, which can be understood by a model of a complex formation in the following way: $Ag_{Pb}^{+} + Ag_i^{-} \longrightarrow [Ag_{Pb}Ag_i]^{o}$.
The electrical activity of such associates, considering point defects, are discussed.