

24.1-01 ORDERING OF THE Pd₆₀Cu₄₀ ALLOY METALLIC LATTICE AT HYDROGENATION. V.F. Degtyareva, V.E. Antonov, I.T. Belash, E.G. Ponyatovskiy. Institute of Solid State Physics, USSR Academy of Sciences, 142432, Chernogolovka, USSR

The electrical resistance of the Pd₆₀Cu₄₀ alloy hydrogenized at P < 20 kbar and T = 200°C increases during ~50 min, then it remains almost unchanged. Exposure of the sample at T > 200°C decreases the electrical resistance irreversibly, that is the evidence of the non-reversible phase transition. An X-ray study of the hydrogenated samples was made after cooling and subsequent releasing the pressure to atmospheric. For the samples hydrogenized at T = 200°C the metallic lattice had a f.c.c. structure with a = 3,897 ± 0,005 Å (at -190°C). This phase should be considered as a hydrogen solid solution on the base of initial f.c.c. lattice of alloy. Samples hydrogenized at T > 200°C had the metal sublattice, which may be described on the base of a face centered tetragonal pseudo-cell with parameters a = 3,958 ± 0,08; c = 3,828 ± 0,012 Å; c/a = 0,967 (at -190°C). The hydrogen content in both cases was n ≈ 0,5. At the hydrogen release from the samples after annealing at 300°C, their metal sublattice retained its tetragonal distortion, the degree of tetragonality even increased. These seem to be favourable for the assumption that the observed tetragonal distortions are due to the atomic ordering of the metal sublattice itself occurring in the Pd₆₀Cu₄₀-H solution. This assumption is supported by appearance of superstructural diffraction lines in addition to the basis ones.

24.1-02 THE CRYSTAL CHEMISTRY OF DOUBLE SYSTEMS OF VANADATE PYROXENES M⁺VO₃ (M = Li, Na, K, Rb, Cs). R.S. Bubnova, S.K. Filatov, V.S. Grunin, Z.N. Zonn, I.V. Roshdestvenskaya, Institute of silicate chemistry, USSR Academy of Sciences, Leningrad, USSR.

In the Na_xLi_{2-x}V₂O₆ system of clinopyroxenes rare continuous isomorphism for Li-Na has been found in the range room-melting point temperatures. The crystal structures of members with X = 0.15, 0.66, 1.00 (Бубнова et al, Кристаллография, (1980) 25, 1287), 1,40 and 2.00 have been determined. The space group is C2/c, diopside structural type. In particular:

	X=0.15, R=0.039			X=0.66, R=0.036		
	x · 10 ⁵	y · 10 ⁵	z · 10 ⁵	x · 10 ⁵	y · 10 ⁵	z · 10 ⁵
V	28854	09452	26441	28914	09277	25211
M1	50000	41957	25000	50000	41683	25000
M2	50000	21426	75000	50000	20812	75000
O1	11522	10951	16420	11637	09790	15259
O2	35469	27029	28328	35218	26342	29165
O3	35505	-02561	07009	35617	-00602	04607

In the structure of NaVO₃ the Li atoms substitute at first the Na atoms in M1-octahedra

up to LiNaV₂O₆, and then in M2-octahedra up to LiVO₃. The temperature deformations of monoclinic crystals of that series are highly anisotropic. The largest α₂ axis of the deformation tensor is oriented along b-axis, the smallest (negative) α₁ axis is placed near the acute bisectrix of β angle of monoclinity. The degree of (α₃ - α₁) anisotropy of monoclinic ac plane correlates with the speed of β angle change, and decreases with increasing temperature and during the transition from the end members of series to the middle ones.

In the NaVO₃(clinopyroxen) - KVO₃(orthopyroxen) system, when Na/K > 1, the isomorphism appears near the end members of series at room temperature and becomes unlimited at 400-450°C. The isomorphism is limited when Na/K < 1.

In the orthopyroxen KVO₃-RbVO₃ system continuous isomorphism is accompanied by almost linear changes of cell dimensions. In the KVO₃-CsVO₃ system isomorphism is limited by intervals 0 < 10 and ~90-100 mol.% in system KVO₃-CsVO₃.

24.1-03 INFLUENCE OF OPTICAL PUMPING ON FERROELECTRIC PHASE TRANSITION IN PROUSTITE Ag₃AsS₃. I.M. Shmytko, V.Sh. Shekhtman, V.I. Ivanov, Institute of Solid State Physics, the USSR Academy of Sciences, Chernogolovka, Moscow district, 142432, USSR.

Influence of optical pumping on a ferroelectric phase transition of the first order has been investigated in Ag₃AsS₃ at 28K by the method of low-temperature diffractometry. Optical pumping was realized from a highpressure xenon lamp. Temperature hysteresis reduced markedly at 10⁵lx and practically vanished at 10⁶lx. If the optical pumping is kept constant at 1-1,5 · 10⁶lx there appears an interval ΔT ~ 1K where the self-oscillating regime of the phase transition, i.e. para-ferro-para state (R3m ↔ P1) takes place. Period of oscillation recorded diffractometrically by the reflection intensity of one such phase is 1,5 sec. The effect was observed when the integral power of illumination was high and it vanished when the spectral composition of the incident light lay within the energy gap (λ ≈ 0,6 mkm). Within the framework of the phenomenological theory of the local field equations, the observed instability of the phase state is related to the appearance in the crystal of a constant electric field due to the optical detection. The employment of an intermittent light involved a drop in the intensity from which the self-oscillations began. At low frequencies of the light pulsations the self-oscillations were periodically recurrent in the nature, i.e. the crystal passed over one of the stable (para