

DIELECTRIC—METAL
TRANSITION DURING A CHANGE
OF THE COMPOSITION OF A HIGHLY DOPED
AND COMPENSATED $\text{TiCo}_{1-x}\text{Ni}_x\text{Sb}$ SOLID
SOLUTION: THE ROLE OF DONOR IMPURITIES

V.A. Romaka^{1,2}, *Yu.V. Stadnyk*³, *M.G. Shelyapina*⁴,
*D. Fruchar*⁵, *V.F. Chekurin*¹, *L.P. Romaka*³,
*A.V. Tkachuk*³

¹Ya. Pidstryhach Institute of Applied Problems
of Mechanics and Mathematics,
Nat. Acad. Sci. of Ukraine

(3b, Naukova Str., Lviv 79060, Ukraine),

²National University "Lviv'ska Politekhnik" "

(12, Bandera Str., Lviv 79013, Ukraine),

³Ivan Franko Lviv National University

(6, Kyryl and Mefodii Str., Lviv 79005, Ukraine;

e-mail: stadnyk_yuriy@franko.lviv.ua),

⁴V.A. Fock Institute of Physics

of the St.-Petersburg National University

(1, Ul'yanovskaya Str., Petrodvorets,

St.-Petersburg 198504, Russia),

⁵Laboratoire de Cristallographie, CNRS

(BP 166, Grenoble 38042, Cedex 9, France)

S u m m a r y

The role of the impurity donor band in the conductivity of a highly doped and compensated TiCoSb semiconductor is determined. The electronic structure of a $\text{TiCo}_{1-x}\text{Ni}_x\text{Sb}$ semiconductor solid solution is calculated. The model of the reconstruction of the impurity band of the TiCoSb semiconductor under its doping by donor impurities is proposed. The theoretically predicted and experimentally verified transition from the activated conductivity to the metallic one during a change of the composition of a $\text{TiCo}_{1-x}\text{Ni}_x\text{Sb}$ solid solution is interpreted as the Anderson transition.