

Abstract Submitted  
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**Investigation of non-uniform materials under pressure** VLADIMIR SHCHENNIKOV, IGOR KOROBAYNIKOV, NATALIA MOROZOVA, VSEVOLOD SHCHENNIKOV JR., VLADIMIR VORONIN, IVAN BERGER, Institute of Metal Physics of RAS, Urals Division, Yekaterinburg, 620990, Russia, LABORATORY OF ELECTRONIC PROPERTIES OF MATTER AT HIGH PRESSURES TEAM, LABORATORY OF NEUTRON INVESTIGATION OF MATTER TEAM, LABORATORY OF MICROMECHANICS TEAM — The approach is considered of the investigation of non-uniform (NU) materials at high pressure (P). Under P a material may become NU due to phase transition (PT). At topological insulators the properties may include the contributions both of the bulk states as well as of the surface ones as at NU material etc.. The approach is based on the model of multi-phase system with ordered phase inclusions of variably configuration (A) and concentration (C), and the experimental data are presented for: i) the substances near PT, ii) some ceramics, iii) the certain natural minerals. Si, ZnX, PbX, SmX (X – Te, Se, S), GaP, iron ores, and  $(WC)_xCo_{1-x}$  hard alloys etc. have been investigated under P up to 30 GPa. It was shown that the model allows to describe resistance (R) and thermoelectric power (S), etc. in the vicinity of PT. For hard alloys WC-Co the elastic modulus has been fitted using the model, and A has been estimated to be distinguished from the simple isotropic case. In the iron ores the A and the C of various components (Fe,  $Fe_yO_x$ , MgO,  $Mg_2SiO_4$ , etc.) has been estimated due to the using of the new approach based on the different depth of penetration of X-ray and neutron radiation, and also on different dependences of S, R on C, A.

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