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ELECTRON STRUCTURE, VALENSE STATE, X-RAY SPECTRA AND SURFACE MORFHOLOGIES OF THE NEW CeM_2P_2 (M=Fe, Co, Ni) COMPOUNDS

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High-energy spectroscopy has been used to study the electronic structure and valence state of new ternary intermetallic CeM_2P_2 (M=Fe, Co, Ni**)** compounds which crystallize in the $ThCr_2Si_2$ types. The calculations of electron energy bands E(k) and partial DOS for compounds were performed by the semi- relativistic linear muffin-tin orbital method without considerations of spin-orbit interactions. Effective filling numbers of electrons in different bands of components in CeM_2P_2 (M=Fe, Co, Ni**)** compounds have been calculated. Analysis of the results of calculations showed that the degree of occupation of *spd*-valence orbital of components varies and differs considerably from of external electrons in isolated atoms. The occupancy of *d*-orbital of M in the CeM_2P_2 compounds was shown to be significantly larger than in an isolated state. The electron configuration of P in compounds can be described as $s^{1.4}p^{2.8}$. L_{III} – absorption spectra Ce in the ternary CeM_2P_2 (M=Fe, Co, Ni**)** compounds were obtained at 78 K and 300 K using a tube spectrometer equipped with an RKD -01 coordinate detector. The mixed valence state of Ce was obtained in the investigated compounds.

Surface morphologies CeM_2P_2 (M=Fe, Co, Ni**)** compounds are investigated by scanning tunneling microscopy (NT-MDT). The range scanning was 100 um x 100 um and 2 um x 2 um. The surface topography, distribution of grain diameter and area were obtained. The distribution of grain diameter and area of the CeM_2P_2 (M=Fe, Co, Ni**)** compounds is established. The picture of the distribution of the stiffness of the samples (amplitude and phase fluctuations) is obtained.