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ELECTRON STRUCTURE, VALENCE STATE AND MAGNETIC PROPERTIES OF THE NEW TERNARY INTERMETALLIC COMPOUNDS: EXPERIMENTAL AND THEORY

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High-energy spectroscopy has been used to study the electron structure and valence state of new ternary intermetallic compounds, which crystallize in the $CeNiSi_2$, $ThMn_{12}$, $ThCr_2Si_2$ and $HfFe_2Si_2$ 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 (LMTO) without considerations of spin-orbit interactions. Effective filling numbers of electrons in different bands of components in $R.E.M_2X_2$ (R.E = Sc, Y, Ce, Yb; M= Fe, Co, Ni, Cu, Pd, Rh; X= P, Si) compounds have been calculated. The electron occupation of the d-states of the M atoms has a dominant influence on the degree of their hybridization. Between the experimental and calculated X-ray emission spectra $R.E.M_2X_2$ good agreement has been obtained. L_{III} - absorption spectra Ce and Yb in ternary $YbNi_4In$ and $Ce(Yb)M_4X_8$ compounds were obtained at 78K and 300K using a tube spectrometer equipped with an RKD-01 co-ordinate detector. The mixed valence state of Ce and Yb was obtained in the $YbNiIn_4$ and $Ce(Yb)M_4Al_8$ compounds.