9.7 cm

XPS investigation of the $Ce(Ag_xCu_{1-x})_2Sb_2$ compounds.

A.Guzik and E.Talik

Institute of Physics, Silesian Universiy, Uniwersytecka 4, 40-007 Katowice, Poland

The electronic structure of the $Ce(Ag_xCu_{1-x})_2Sb_2$ compounds was investigated by the XPS method. The valence band spectra and electronic states Ag 4d, Ag 3d, Cu 3d, Cu 2p, Sb 3d are presented. Their fine structure is discussed based on structural details derived form neutron diffraction data. The location of lines in spectra of cerium, copper and silver are shifted to higher binding energy, whereas the lines of antimony are shifted to lower energy. The 3d and 4d lines of antimony show a complex structure, which may be related to changes in the valence band caused by the strong chemical bond. Mainly important for magnetism in presented compound, the Ce 3d lines are split due to spin-orbit interaction and additionally each peak consists of three internal peaks, representing the $3d^9 4f^n$ (n=0,1,2) shake-down satellites. Such a phenomenon is observed because the hybridization of the 4f electrons and the conduction electrons is present in investigated compounds. The estimated hybridization energy varies from 60 meV for $Ce(Ag_{0.4}Cu_{0.6})_2Sb_2$ up to 110 meV for $CeCu_2Sb_2$. The refined hybridization energy is discussed, based on previously found magnetic properties of investigated compounds.

13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

Presentation mode :
poster

Corresponding author :
Adam Guzik

Address for correspondence :
Instytut Fizyki
Uniwersytet Śląski
Uniwersytecka 4
40-007 Katowice

Email address :
aguzik@us.edu.pl