Transmission Functions of a Scienta SES-200 Hemispherical Analyzer.

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INTRODUCTION

Most of the information extracted from photoelectron spectra comes from the relative comparison of line intensities. As the range of kinetic energy in experiments carried out at synchrotron light sources is usually wide, the transmission function of the electron energy analyzer must be accounted for. The transmission functions of a Scienta SES-200 hemispherical analyzer have been determined for different pass energies (5,10,20 and 40 eV). The method is based on the measurement of the intensity ratio between photoelectron lines with dispersing kinetic energy and the corresponding Auger lines with constant kinetic energy. The standard Auger line intensities of the Xe $N_{4,5}OO$ spectrum have been obtained and used as a test of the reliability of the correction procedure.

RESULTS

The method proposed in [1] is based on the measurement of the intensity ratio between photoelectron lines and Auger lines related to the decay of the same core-hole vacancy using tunable synchrotron radiation. Because of their constant kinetic energy, the Auger lines have a constant transmission, whereas the photoline intensity reflects the relative transmission of the spectrometer.

In the present work, the transmission function F is given by the ratio of the $4d_{5/2}$ photoline in Xenon and some selected Auger lines N_5OO.

$$F_{5/2}(E_{kin}) = I_{4d_{5/2}}/(I_{51}+I_{52}+I_{53})$$

In order to include the ratio of the $4d_{3/2}$ photoline and the corresponding Auger lines N_4OO, a scaling factor R needs to be calculated using the ratio taken at high photon energy.

$$F_{3/2}(E_{kin}) = R*I_{4d_{3/2}}/(I_{41}+I_{42}+I_{43})$$

The resulting transmission curves are shown in Fig.1.

The lines were fitted with a modified Voigt profile accounting for Post Collision Interaction (PCI) distortion. All the Auger lines belonging to the same group were constrained to have equal width and asymmetry. The relative intensities once corrected agree well with the values in the literature [2].

REFERENCES

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Fig.1 Transmission functions for 5, 10, 20 and 40 eV pass energy.