SEARCHING FOR THE LIFETIME BROADENING OF THE RUBIDIUM *KLL* AUGER LINES

Inoyatov A.Kh.[1,2], Kovalik A.[1,3], Perevoshchikov L.L.[1], Filosofov D.V.[1], Yushkevich Yu.V.[1], Ryšavý M.[3], Karaivanov D.[1,4]
[1]*JINR, Dubna;* [2]*IAP of NUUz, Tashkent;* [3]*NPI CAS, Řež, CR;* [4]*INRNE BAS, Sofia, BR*
E-mail: inoyatov@jinr.ru

It is known that if the peripheral electron configuration of an atom is changed (by multiple ionization or by chemical bonding), atomic level energies changed and Coster-Kronig decay channels may either open or close. This results also in changing of the *KLL* Auger line widths. Thus, e.g., in the case of 3*d* transition metal series the KL_2L_3 Auger lines are broader in the metal than in free atoms due to this lifetime effect. Having to our disposal two ^{85}Sr ($T_{1/2}$=64.9 d) sources prepared by vacuum evaporation on a C backing and by implantation of 30 keV ^{85}Sr ions into a Pt matrix we decided to search for the about effect also in the case of ^{85}Rb situated in quite different matrices. The *KLL* Auger spectra were measured with a combined electrostatic electron spectrometer [2]. Obtained natural widths (in eV) for individual *KLL* Auger lines are presented in the table together with the estimated values. As can be seen, the values measured for the

	^{85}Sr source			Estimated
Auger line	Evaporated	Implanted	W.M.[a)]	W.M.[b)]
KL_1L_1	9.3(1.3)	8.2(1.0)	8.6(8)	10.9(3)
KL_1L_2	7.8(9)	8.1(6)	8.0(5)	8.3(3)
KL_1L_3	8.1(1.9)	7.3(8)	7.4(8)	8.2(3)
KL_2L_2	5.5(2.0)	5.3(1.3)	5.4(1.1)	5.7(2)
KL_2L_3	4.8(2)	5.1(2)	5.0(1)	5.6(2)
KL_3L_3	4.6(4)	5.6(4)	5.1(3)	5.5(2)

[a)] W.M. means "weighted mean".
[b)] Values obtained from weighted means of natural level widths [2,3,4].

evaporated and implanted sources agree with each other within one standard deviation with the exception of the KL_3L_3 line. Nevertheless some indication of broadening can be identified for the well resolved KL_1L_2, KL_2L_3, and KL_3L_3 lines. Evidently much higher spectrum statistics is required for searching for the lifetime effect. Estimated natural widths values do not fit well the weighted means of the measured ones for the KL_1L_1 and KL_2L_3 lines.

The work was supported by the GACR grant P 203/12/1896.

1. Ch.Brianşon *et al.* // Nucl. Instrum. Methods. 1984. V.221. P.547.
2. A.Kh.Inoyatov *et al.* // EPJ. A. 2014, to be published.
3. M.O.Krause, J.H.Oliver // J. Phys. Chem. Ref. Data. 1979 V.8. P.329.
4. J.L.Campbell, T.Papp // ADND Tables. 2001. V.77. P.1.