

XANES AND MÖSSBAUER SPECTROSCOPY IN STUDY OF IRON VALANCE STATES IN TISSUES

K. Dziedzic-Kocurek¹, A. Banas², W. M. Kwiatek², and J. Stanek¹

¹*Institute of Physics, Jagiellonian University, Reymonta 4, 30-059 Kraków, Poland*

²*Institute of Nuclear Physics, Polish Academy of Sciences, Radzikowskiego 152, 31-342 Kraków, Poland*

The application of Mössbauer spectroscopy for the determination of the valance states of iron is obvious. However, in case of iron in tissues, this method often fails due to the low concentration of Mössbauer probe. On the other hand, the X-ray Absorption Near Edge Spectroscopy (XANES) requires a smaller amount of iron, but the acquired information on iron oxidation states is not straightforward. By searching for the correlation between the results obtained by these two selected methods one may avoid limitations characteristic of each method. In this paper we try to describe the iron XANES spectra for compounds of iron in different valance and spin states, concluded from Mössbauer spectroscopy.

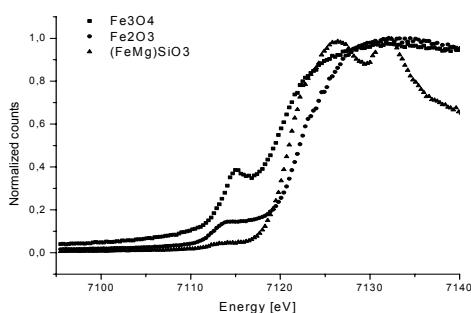


Fig. 1. XANES spectra for selected standards

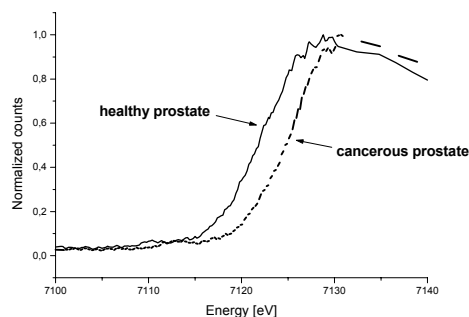


Fig. 2. Iron XANES spectra from places containing high iron concentration in the cancerous and healthy prostate tissues

These two parameters, e.i. the intensity of the pre-peak and the shift of the absorption edge should be related to the Mössbauer parameters, e.i. isomer shift and quadrupole splitting. In the paper the comparison of the data obtained for about 20 compounds by these two methods is presented and the prospects for determination of the valance states of iron in healthy and cancerous tissues are discussed. In particular, different position of K-edge absorption of iron in the cancerous and healthy prostate tissues is clearly observed [1] (Fig. 2).

[1] W. M. Kwiatek, A. Banas, K. Banas, M. Gajda, M. Gałka, G. Falkenberg and T. Cichocki
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