FIRST APPROACH TO STUDIES OF SULPHUR ELECTRON DOS IN PROSTATE CANCER CELL LINES AND TISSUES STUDIED BY XANES

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Keywords: prostate cancer, sulphur, DOS, XANES

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Urological cancers comprise approximately one third of all cancers diagnosed in men worldwide, and out of these prostate cancer is the most common one [1]. Therefore, there is a significant medical need to investigate these diseases with different techniques, as the etiology of them is not well known.

The synchrotron methods already have been applied in the examination of biological samples and these techniques are constantly developed. Hence, prostate cancer cell lines and tissues along with selected organic and inorganic compounds used as standards were studied with X-ray absorption fine structure spectroscopy. The experiment was held at the DRX1 beamline at LNF, Frascati (Italy). The K-edge of sulphur was chosen for the studies because it is an essential biological element and its biochemistry is only partially understood [2]. It is believed that changes to the structure of protein binding sites, where sulphur is present, alter cells metabolism and these changes may play an important role in carcinogenesis.

The previous studies of sulphur K-edge XANES spectra of prostate cancer cell lines and tissues showed the presence of sulphur on –II oxidation state and similarity to $Na_2S_2O_3$ XANES spectrum [3], as shown in Fig. 1. However, one should notice that out of sulphur atoms present in $Na_2S_2O_3$, one atom is present in –II oxidation state and the second one is in +VI oxidation state.

For further studies, the comparison is made between the experimental results collected during XANES measurements and the theoretical calculations of electron density of states. In this work, the first results of these studies are presented.

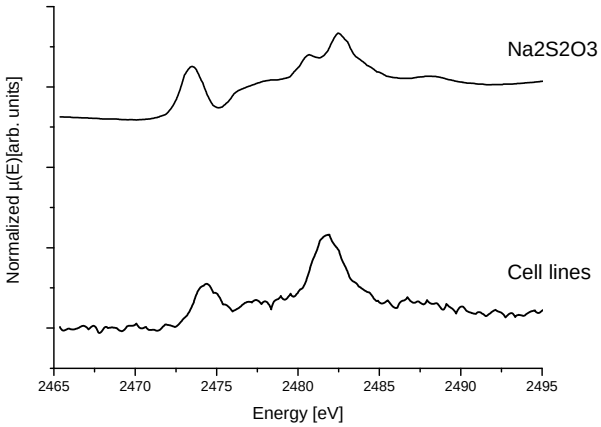

Figure 1. XANES sulphur K-edge spectra of $Na_2S_2O_3$ and cell lines.

References

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