AUGER ELECTRONS VIA K_α X-RAY LINES OF PLATINUM COMPOUNDS FOR NANOTECHNOLOGICAL APPLICATIONS

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We will report study on the K_α X-ray lines of platinum. Pt compounds, such as cisplatin, are common in biomedical applications. The active element Pt can emit or absorb hard X-rays. We have obtained the photoionization cross sections from the oscillator strengths of 1s-2p (K_α) transitions in Pt ions. We find that these transitions appear as resonances in photoionization in the hard X-ray energy range of 64 - 71 keV (0.18 - 0.17 $\AA$) below the K-shell ionization and with a strength orders of magnitude higher compared to that at the K-shell ionization. This is the focus of our study for possible initiation of an emission cascade of Auger electrons at the resonant energy. We will present the oscillator strengths and attenuation coefficients per unit mass for all the K_α transitions in the event platinum cascades through various, namely from fluorine-like to hydrogen like, ionic states. The study is motivated by uur proposed method, *Resonant Theranostics*[b,c] (RT) for biomedical appliations, which aims to find narrow band X-ray energy that corresponds to *resonant* photo-absorption and leads to emission of Auger electrons. As the next step of the RT method we will also report on experimental results on producing monochromatic X-rays, targeted to the resonant energy, from the wide band Bremstruhlung radiation of a conventional X-ray source.
[a] [b] [c]

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[b]"Resonant X-Ray Enhancement of the Auger Effect in High-Z atoms, molecules, and Nanoparticles: Biomedical Applications", A.K. Pradhan, S.N. Nahar, M. Montenegro, Yan Yu, H.L. Zhang, C. Sur, M. Mrozik, R.M. Pitzer, J. of Phys. Chem. A, 113 (2009), 12356.

[c]"Monte Carlo Simulations and Atomic Calculations for Auger Processes in Biomedical Nanotheranostics", M. Montenegro, S. N. Nahar, A. K. Pradhan, Ke Huang, Yan Yu, J. of Phys. Chem. A, 113 (2009), 12364.