Abstract Submitted
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Resonant X-Ray Attenuation by Highly Ionized Ions of High-Z Elements[1] ANIL PRADHAN, SULTANA NAHAR, Ohio State U, YAN YU, Thomas Jefferson U, C. SUR, M. MONTENEGRO, M. MROZIK, R. PITZER, Ohio State U — Heavy elements interact very efficiently with X-rays with large attenuation coefficients. Ionization and excitation of extended electronic shells have large photoabsorption cross sections up to very high energies. It is shown that X-ray absorption in gold ions is considerably enhanced by factors of up to 1000 or more at energies of K-shell resonances from the K-alpha excitation energy to the K-ionization edge at ∼80 keV. Such large enhancements may be realized by X-ray irradiation in the 67-80 keV range creating inner-shell vacancies below the K-edge. We calculate the Auger resonant probabilities and cross sections to obtain total mass attenuation coefficients with detailed resonance structures for the K —> L,M,N,O,P shell transitions. This work may be potentially useful in the calculation of resonant plus non-resonant attenuation coefficients by high-Z elements in plasmas created with high-intensity lasers, monochromatic synchrotron light sources, and electron-beam-ion-traps. Spectral models for X-ray absorption and transmission, and properties of chemical compounds of high-Z elements for applications in medical and nanotechnology research are also under investigation.

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