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The ionization balance of gold in the Livermore Electron Beam Ion Trap M. MAY, LLNL, S. HANSEN, SNL, H.-K. CHUNG, K. REED, J. SCOFIELD, M. SCHNEIDER, B. WILSON, K. WONG, P. BEIERSDORFER, LLNL — Spectra have been recorded from gold that has been injected into the Lawrence Livermore Electron Beam Ion Trap (EBIT-II). Both monoenergetic and experimentally simulated Maxwell-Boltzmann (MB) non-local thermodynamic equilibrium (NLTE) plasmas were created for these measurements. The beam plasmas had energies of 2.75, 3.0, 3.6, 4.6, 5.5, 6.0 and 6.5 keV. The MB plasmas had electron temperatures of 2.0, 2.5 and 3.0 keV. M-band gold spectra (n = 4-3, 5-3, 6-3 and 7-3 transitions) were recorded between 1-8 keV from K-like to Kr-like ions in the X-ray. The emission of gold was recorded by crystal spectrometers and a micro-calorimeter from the Goddard Space Flight Center. The experimental charge state distribution was inferred by fitting the observed spectra with modelled spectra from the Hebrew University Lawrence Livermore Atomic Code and the Flexible Atomic Code (FAC). The charge state distribution has been modelled using the SCRAM collisional radiative model with FAC atomic data. Fairly good agreement between the experimental and the calculated charge state distributions for several of the beam plasmas has been achieved by including dielectric recombination from high n = 10 to 15 states. This work was done under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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