

# A High-Precision Measurement of the Molybdenum *K*-shell X-ray Spectrum

Marcus H. Mendenhall<sup>1</sup>, Lawrence T. Hudson<sup>1</sup>, Csilla I Szabo<sup>2,1</sup>,  
Albert Henins<sup>1</sup>, and James P. Cline<sup>1</sup>

<sup>1</sup>National Institute of Standards and Technology, Gaithersburg MD 20899, USA  
email: marcus.mendenhall@nist.gov

<sup>2</sup>Theiss Research, La Jolla CA 92037, USA

Building on our previous work with the copper  $K\alpha$  spectrum, we have completed a new measurement of the Mo  $K$ -shell emission spectrum, using the same fully-traceable diffractometer and crystals as before. We include  $KL$ ,  $KM$ , and  $KN$  lines. These measurements were made using a significantly improved data analysis process compared to those of our previous copper work, which allows more rigorous quantification of the uncertainty due to the axial divergence. We find the position of the Mo  $KL_3$  ( $K\alpha_1$ ) line to be completely consistent with previous high-quality measurements. Other lines in the system show significant differences from previously published values (up to 2 eV against combined uncertainties of 0.5 eV). These measurements contribute to a project which will yield a database of not only line positions, but lines shapes and relative intensities.