Abstract Submitted
for the APR16 Meeting of
The American Physical Society

A new, high-precision measurement of the X-ray Cu Kα spectrum MARCUS H. MENDENHALL, JAMES P. CLINE, ALBERT HENINS, LAWRENCE T. HUDSON, CSILLA I. SZABO, DONALD WINDOVER, NIST, 100 Bureau Dr., Gaithersburg MD 20899 — One of the primary measurement issues addressed with NIST Standard Reference Materials (SRMs) for powder diffraction is that of line position. SRMs for this purpose are certified with respect to lattice parameter, traceable to the SI through precise measurement of the emission spectrum of the X-ray source. Therefore, accurate characterization of the emission spectrum is critical to a minimization of the error bounds on the certified parameters. The presently accepted sources for the SI traceable characterization of the Cu Kα emission spectrum are those of Härtwig, Hölzer *et al.*, published in the 1990s. The structure of the X-ray emission lines of the Cu Kα complex has been remeasured on a newly commissioned double-crystal instrument, with six-bounce Si (440) optics, in a manner directly traceable to the SI definition of the meter. In this measurement, the entire region from 8020 eV to 8100 eV has been covered with a highly precise angular scale and well-defined system efficiency, providing accurate wavelengths and relative intensities. This measurement is in modest disagreement with reference values for the wavelength of the Kα_1 line, and strong disagreement for the wavelength of the Kα_2 line.

Marcus H. Mendenhall
NIST, 100 Bureau Dr., Gaithersburg MD 20899

Date submitted: 05 Jan 2016 Electronic form version 1.4