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A Novel Micro-Mott Polarimeter with Cylindrical Symmetry[1]
NATHAN CLAYBURN, EVAN BRUNKOW, University of Nebraska - Lincoln, GEORGE RUTHERFORD, Illinois State University, SAMANTHA BURTWISTLE, TIMOTHY GAY, University of Nebraska - Lincoln — A novel micro-Mott polarimeter of cylindrical symmetry has been designed, constructed, and tested. It has a maximum efficiency at 10 keV of 5 x 10^{-4} when ΔE = 1300 eV. (We define ΔE to be the maximum energy loss an electron scattering from the polarimeter's Au target can have suffered and still be detected [1].) At 20 keV, the maximum voltage we put on the Au target, the effective Sherman function (analyzing power) is 24% at ΔE = 600 eV where the efficiency is 5 x 10^{-5}. Below ΔE of 500 eV at 20 keV, pollution from positive ions and x-rays reduces the analyzing power. We present SIMION [2] simulations that explain qualitatively this latter result.

[1] T.J. Gay, J.A. Brand, J.E. Furst, M.A. Khakoo, W.V. Meyer, W.M.K.P. Wijayaratna, and F.B. Dunning, Rev. Sci. Instrum. 63, 114 (1992).
[2] SIMION® Version 8.1

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