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Experimental Errors in Mueller Matrix Elements of Isotropic Samples[1] F ABADIZAMAN, J MOYA, S ZOLLNER, NMSU — Ellipsometry is to study the electronic properties of materials. Using a polarizer-sample-rotating analyzer (PSrA) ellipsometry configuration, polarized incident and reflected beams are described by Jones vectors. The effect the sample has on the incident polarization state is given by the Jones matrix. In general, this type of ellipsometry only works for non-depolarizing samples. To study depolarizing samples, generalized Mueller matrix ellipsometry (MME) is used. In MME, the Stokes vectors represent the polarization state of the incident and reflected beams, and the Mueller matrix describes the effect the sample has on the beam. The configuration used in this study is given by: polarizer-compensator-sample-rotating analyzer (PCSrA), in which 11 of the 16 MM elements can be measured. In the special case that the sample is non-depolarizing, the MM has a simple pattern and can be transformed into the Jones matrix. Four samples representing insulating, metallic, and semi-conducting materials were measured from 1 to 6 eV using MME. The measured MM elements are consistent with the MM for isotropic, non-depolarizing samples. Furthermore, to understand the experimental error in future experiments, straight-through MME measurements were taken.

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