Abstract Submitted
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Correction Factors for 4-probe Electrical Transport Measurements with Finite Size Electrodes: Analytical and Finite Element Analysis[1] E.J. ZIMNEY, G. DOMMETT, D.A. DIKIN, R.S. RUOFF, Department of Mechanical Engineering, Northwestern University, Evanston, IL 60208 — In most real specimens the current density is non-uniform through the thickness between the sense (potential) probes. Non-uniformities in the current density can result from many effects including the geometry of the specimen, the finite size of the electrodes, anisotropic behavior of the material, etc. Thus great care must be taken in extracting the correct bulk resistivity from the measured resistance. We have developed a method, based on finite element analysis, to accurately determine the bulk in-plane resistivity from collinear 4-probe resistance measurements on isotropic and anisotropic materials. The effect of boundary conditions on the measured resistivity is explored. Our finite element approach can be universally applied to 4-probe measurements on complex specimen geometries with arbitrary electrode arrangements.

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