

Abstract Submitted
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Effects on Low Voltage Electron Beam Lithography MEHDI BOLORIZADEH, EM Facility, University of Tennessee, DAVID C. JOY, Oak Ridge National Laboratory — To examine the practical limits and problems of low voltage operation we have studied e-beam lithography in the low (few keV) to ultra-low (<500eV) energy range, employing commonly used resists such as PMMA and compared the results to those from conventional high voltage processing. We have directly imaged, exposed and developed resist profiles as well as deposited metal after liftoff, using scanning electron microscopy, and compared to our advanced Monte Carlo simulations which incorporate elastic, inelastic, fast secondary electrons, and plasmon contributions. The results show that the exposed profiles and resolutions experimentally achieved at low energy can only be matched by simulations which include a significant FSE and plasmon contributions to the energy PSF. With an optimized resist thickness proximity effects are greatly reduced and process latitude is improved.

Mehdi Bolorizadeh
EM Facility, University of Tennessee

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