Comparative Study of the Negative Resists ARN 7520 and ma-N 2410 in Electron Beam Lithography

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Abstract. A variety of methods exist for the fabrication of optoelectronic devices, among which electron beam (e-beam) lithography stands out for its ability to pattern and replicate structures with nanoscale resolution. Over the past decade, many research groups have devoted significant effort to experimentally exploring the resolution limits and precision of e-beam lithography. To achieve better control, linearity, and uniformity of the critical dimensions of optoelectronic structures such as regular line gratings, there is a growing demand for e-beam resists that are more sensitive, offer finely controllable cross-sectional profiles, exhibit reduced line edge roughness, and are more etch-resistant. This paper focuses on investigating the properties and limitations of negative e-beam resists ARN 7520 and ma-N 2410, with the aim of optimizing the conditions for regular line grating patterning in optoelectronic applications.