1. Title:	A detailed study of three champion EUV photoresists
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5. EUVL topic (check only one by "X")	☐ Exposure Tools (ET) ☐ Optics & ML Coatings (ML) ☐ Sources (SO) ☐ Optics Contamination (OC) ☒ Resists (RE) ☐ Device Integration (DE) ☐ Masks (MA) ☐ Technology Readiness (TR) ☐ Defect Inspection (DI) ☐ Cost of Ownership (CO) ☐ Reticle Contamination (RC)
6. Presentation preference:	☒ oral ☐ poster

7. Abstract body:

Following the announcement of 20 nm half-pitch 1:1 lines at the 2008 EUV Symposium, there has been little improvement in EUV photoresist. Part of the difficulty with resist learning/engineering is the unavailability of (often proprietary) constituent make-ups of the best performing platforms. As a result, well-performing formulations rarely serve as a research model for the generation of further refined formulations.

In this paper three of today's champion CA EUV photoresists are quantitatively compared in terms of photoacid generator (PAG) density, base density, resolution, line edge roughness (LER), and sensitivity (the RLS parameters). The assembly of supplier-provided PAG + base densities and quantitative resolution + sensitivity data provide a rich information set that enables a full shot noise counting model to be employed. The results of the model elucidate many observed performance differences in terms of through-pitch patterning and LER. This work was supported by the Director, Office of Science, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

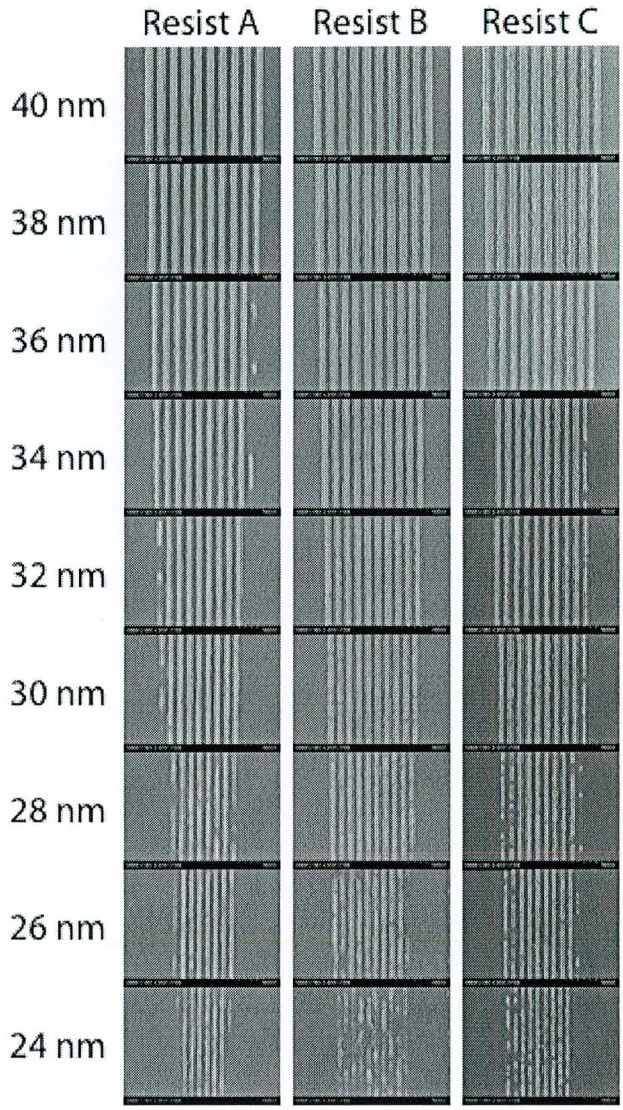

Figure 1: 1:1 lines printed in Resist A, Resist B, and Resist C at half-pitches from 34 nm to 24 nm. Exposures were performed at the 0.3 numerical aperture SEMATECH Berkeley Microfield Exposure Tool (BMET) using conventional $\sigma = 0.35 - 0.55$ annular illumination. Note: annular illumination is not the optimal illumination for line-space printing.