Corner rounding in photoresists for extreme ultraviolet lithography

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Deprotection blur in EUV resists fundamentally limits the smallest sized dense features that can be patterned in a single exposure and development step. Several metrics have recently been developed to explore the ways that different resist and process parameters affect the deprotection blur in EUV resists [1-3]. One of these metrics is based on the imaging fidelity of a sharp corner on a large feature [4]. As this metric has involved the close inspection of printing fidelity of corner features, it has brought attention to an interesting phenomena: corners print differently whether or

not the remaining resist edge contains 270 degrees of resist or 90 degrees of resist (see Figure 1). Here we present experimental data across a wide sampling of leading resists to show this effect is real and reproducible. We provide aerial image modeling results assuming thin and realistic mask models that show no corner bias between the aerial images in the 90-degree and 270-degree configurations. We also compare modeled patterning results assuming several resist models including the single blur, dual blur, and Prolith models, none of which reproduce the corner biasing that is observed experimentally.

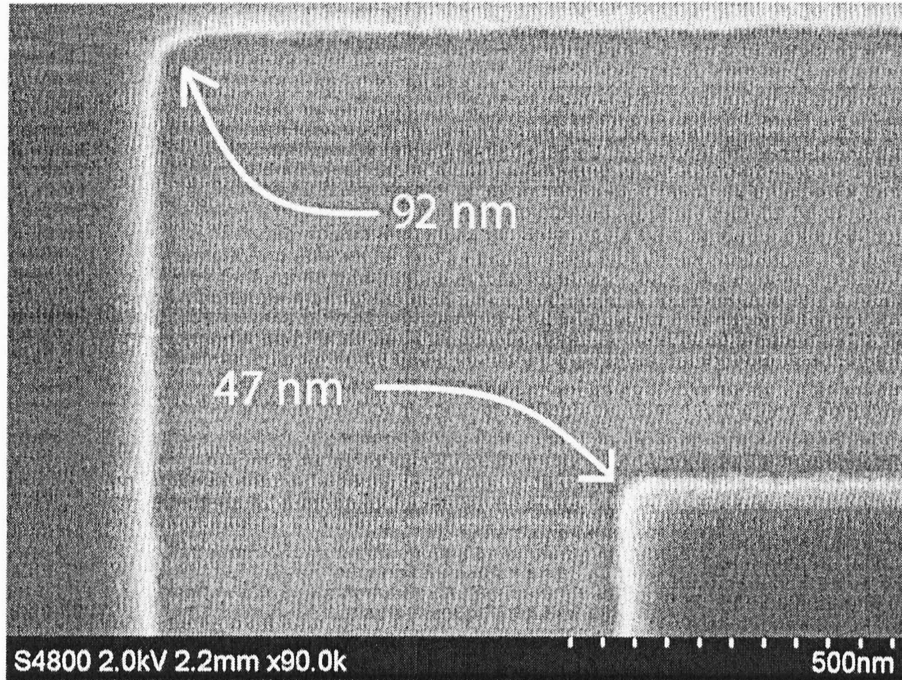

Figure 1: Measured radii of curvature of corners of a 700 nm elbow with 270 degrees of remaining resist (92 nm) and 90 degrees of remaining resist (47 nm).

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