

Improvement of Line-Edge Roughness on Pt-based Ultrafine Nanorods by Post-Exposure Bake

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Nanofabrication processes, such as electron-beam lithography (EBL), extreme ultraviolet (EUV) and nanoimprint lithography (NIL), using non-chemically amplified resists (non-CARs) have been intensively developed to minimize feature size of nanoscale electronic devices. It is reported that high-resolution photomasks on the order of 20 nm were fabricated by EBL with a combination of a non-CAR and post-exposure bake (PEB), where PEB contributed to reducing linewidth and improving line-edge roughness (LER) of the patterns [1]. In this study, we demonstrate the reduction in linewidth and improvement of LER on Pt-based ultrafine nanorods by PEB. SEM images of the Pt-based nanorods without and with PEB at 100 °C for 1 minute are shown in Fig. 1. The nanorod without PEB showed mean linewidth of 13.2 nm and LER of 6.3 nm, while the one with PEB showed mean linewidth of 9.9 nm and LER of 4.1 nm. Thus, the reduction in linewidth and improvement of LER on the Pt-based nanorods were demonstrated by the optimal PEB treatment.

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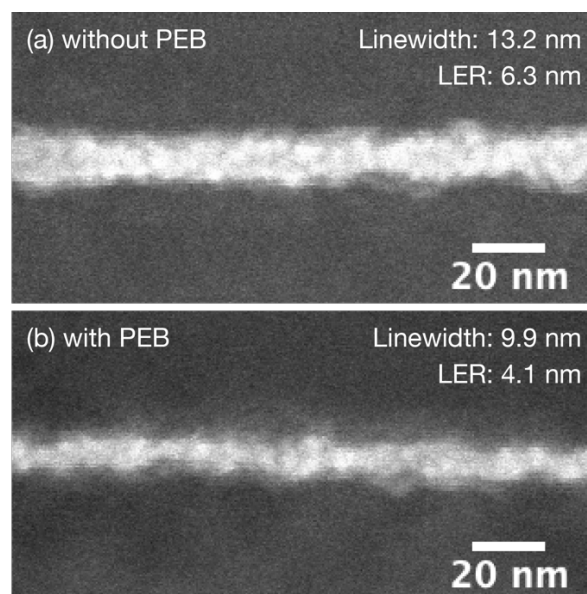


Fig. 1. SEM images of Pt-based nanorods (a) without and (b) with PEB at 100 °C for 1 minute.

[1] H. Miyoshi, *et al.*, *Microelectron. Eng.*, **143**, 48 (2015).