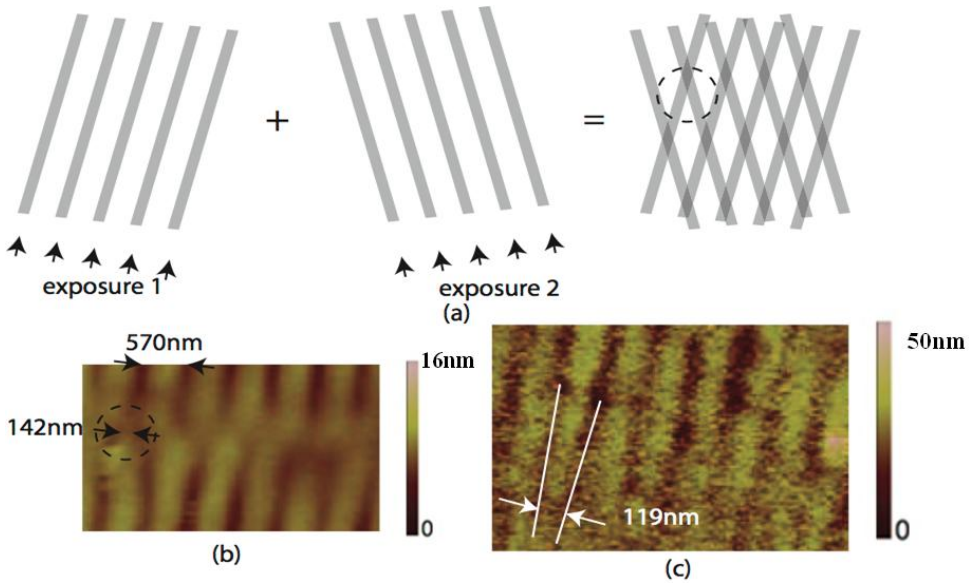

Fig. 4. (a) Schematic of a 2-step exposure, where the 2nd exposure is rotated with respect to the 1st. (b) and (c) Atomic-force micrographs of two samples that were exposed twice with a small rotation in between. Black-dashed circles show the corresponding regions.

Optics has significant advantages for high-throughput nanomanufacturing as evidenced by the ubiquitous popularity of optical-projection lithography in semiconductor manufacturing. However, the far-field diffraction limit is a fundamental physical barrier that curtails nanomanufacturing. In this article, we described preliminary results that demonstrate the feasibility of absorbance-modulation optical lithography (AMOL) as a means to multiple exposures with no intervening process steps. Further optimization of the photochromic material and the photoresist, when combined with an array of two-dimensional nodes in the λ_2 beam can generate nanoscale patterns of complex geometries analogous to super-resolution imaging of complex distribution of fluorophores [20].

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