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- (54) **Title:** MOLECULAR ARRAYS AND METHODS FOR GENERATING AND USING THE ARRAYS

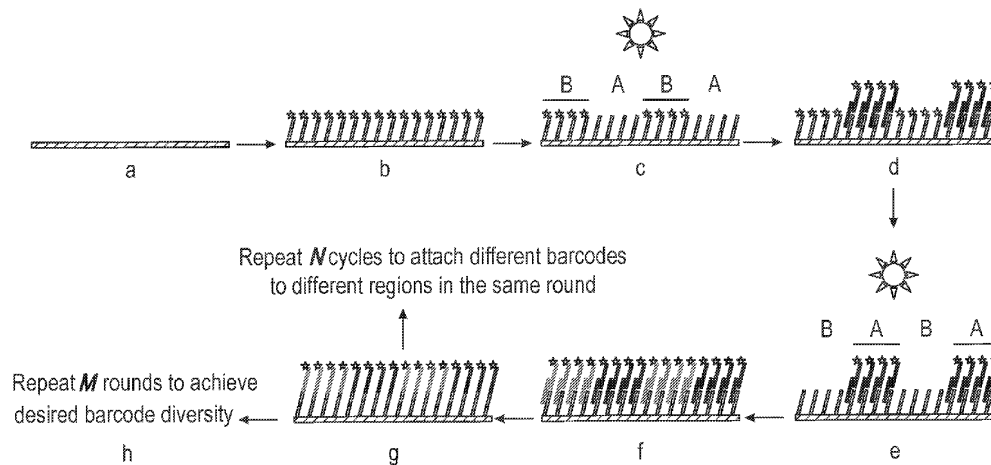


FIG. 4

- (57) **Abstract:** Provided in some aspects are methods for light-controlled in situ surface patterning of a substrate. Compositions such as nucleic acid arrays produced by the methods are also disclosed. In some embodiments, provided herein is photocontrollable hybridization, where oligonucleotides with photo-caged bases prevent hybridization of complementary nucleic acid strands. Uncaging of the oligonucleotides allows hybridization and/or ligation of nucleic acid molecules at the exposed area. A large diversity of barcodes can be created in molecules on the substrate via sequential rounds of light exposure, hybridization, and ligation.

[Continued on next page]



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