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(71) Applicant: **APPLIED MATERIALS, INC.** [US/US];  
3050 Bowers Avenue, Santa Clara, California 95054 (US).

(72) Inventors: **BERGMAN, Eric J.**; c/o Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054 (US). **KLOCKE, John L.**; c/o Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054 (US). **BERNT, Marvin L.**; c/o Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054 (US). **XU, Jing**; c/o Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054 (US). **ROH, Kwan Wook**; c/o Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054 (US).

(74) Agent: **CAMPBELL, Quinten**; Kilpatrick Townsend & Stockton LLP, Mailstop: IP Docketing-22, 1100 Peachtree Street, Suite 2800, Atlanta, Georgia 30309 (US).

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(54) Title: NANOTWIN COPPER MATERIALS IN SEMICONDUCTOR DEVICES

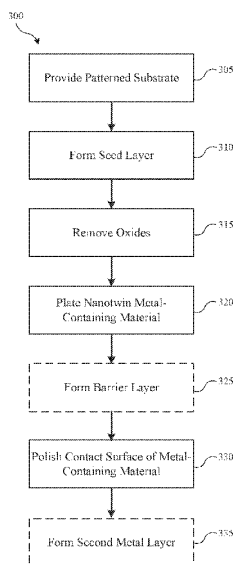


FIG. 3

(57) Abstract: Exemplary methods of electroplating a metal with a nanotwin crystal structure are described. The methods may include plating a metal material into at least one opening on a patterned substrate, where at least a portion of the metal material is characterized by a nanotwin crystal structure. The methods may further include polishing an exposed surface of the metal material in the opening to reduce an average surface roughness of the exposed surface to less than or about 1 nm. The polished exposed surface may include at least a portion of the metal material characterized by the nanotwin crystal structure. In additional examples, the nanotwin-phased metal may be nanotwin-phased copper.

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