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

(72) Inventors: **LU, Jinyu**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **GODET, Ludovic**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **FU, Jinxin**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **OHNO, Kenichi**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **CHEN, Shangyi**; c/o Applied Materials, Inc. Law Dept.,

M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **KURATOMI, Takashi**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **CHEN, Erica**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **HOURLANI, Rami**; c/o Applied Materials, Inc. Law Dept., M/S 1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US). **SUN, Yangyang**; c/o Applied Materials, Inc. Law Dept., MS/1269, 3050 Bowers Avenue, Santa Clara, California 95054 (US).

(74) Agent: **PATTERSON, B. Todd** et al.; 24 Greenway Plaza, Suite 1600, Houston, Texas 77046 (US).

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(54) Title: LOW REFRACTIVE INDEX MATERIALS ON THE GRATINGS TO IMPROVE THE WAVEGUIDE EFFICIENCY

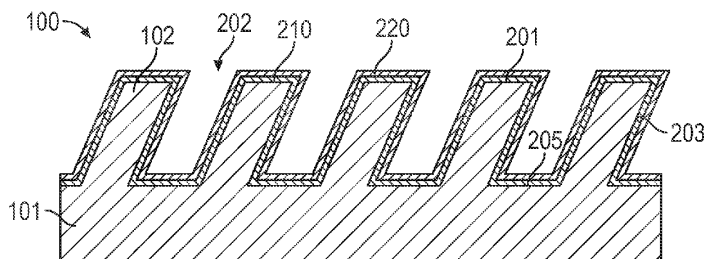


FIG. 2

(57) Abstract: Embodiments described herein relate to improved waveguides with materials layers improving the optical properties of one or more surface regions of waveguides and methods of forming the same. In one embodiment, a waveguide is provided. The waveguide including a substrate, a grating disposed in or on the substrate, the grating comprising a plurality of structures defined by a plurality of trenches, a layer of silicon oxide or aluminum oxide disposed over the structures on the substrate. The layer is disposed over sidewalls and top surfaces of the structures, and a bottom surface of the trenches. The waveguide further includes a high index layer disposed over the layer. The high index layer is disposed over the sidewalls and the top surfaces of the structures, and the bottom surface of the trenches with the layer disposed in between the structures and the high index layer.

[Continued on next page]

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