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(54) Title: APPARATUS AND METHODS FOR PULSED PHOTO-EXCITED DEPOSITION AND ETCH

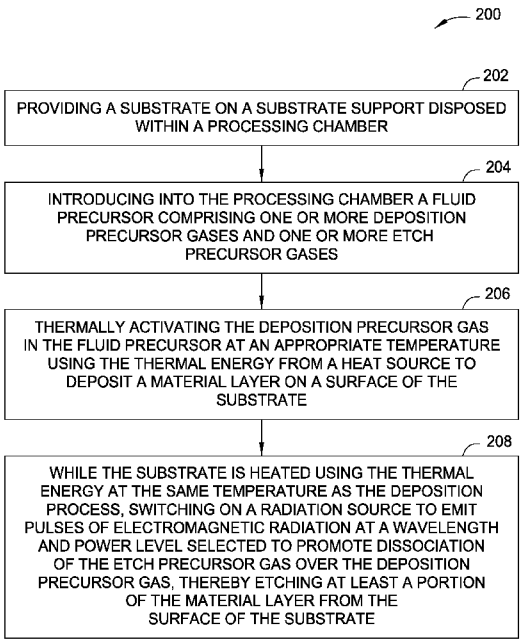


FIG. 2

(57) Abstract: Embodiments of the invention provide methods for processing a substrate within a processing chamber. In one embodiment, the method comprises providing a precursor gas mixture into the processing chamber, the precursor gas mixture comprising a deposition precursor gas and an etch precursor gas, subjecting the precursor gas mixture to a thermal energy from a heat source to deposit a material layer on a surface of the substrate, wherein the thermal energy is below the minimum required for pyrolysis of the etch precursor gas, and after the material layer is formed on the surface of the substrate, subjecting the precursor gas mixture to a photon energy from a radiation source, the photon energy having a wavelength and a power level selected to promote photolytic dissociation of the etch precursor gas over the deposition precursor gas and etch a portion of the material layer from the surface of the substrate.

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