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(54) Title: SEAM MITIGATION AND INTEGRATED LINER FOR GAP FILL

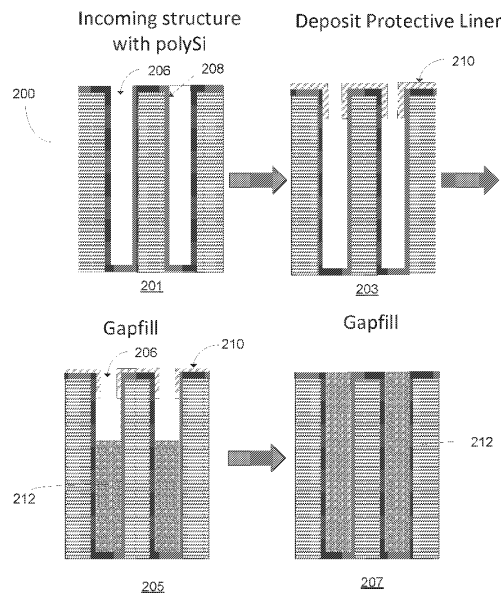


FIG. 2A

(57) **Abstract:** Methods of filling a gap with a dielectric material including using an inhibitor plasma during deposition. The inhibitor plasma increases a nucleation barrier of the deposited film. When the inhibitor plasma interacts with material in the feature, the material at the bottom of the feature receives less plasma treatment than material located closer to a top portion of the feature or in field. Deposition at the top of the feature is then selectively inhibited and deposition in lower portions of the feature proceeds with less inhibition or without being inhibited. As a result, bottom-up fill is enhanced, which can create a sloped profile that mitigates the seam effect and prevents void formation. In some embodiments, an underlying material at the top of the feature is protected using an integrated liner. In some embodiments, a hydrogen chemistry is used during gap fill to reduce seam formation.

[Continued on next page]

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