

METHOD TO CREATE AIR GAPS

ABSTRACT OF THE DISCLOSURE

5 Tin oxide films are used to create air gaps during semiconductor substrate processing. Tin oxide films, disposed between exposed layers of other materials, such as SiO₂ and SiN can be selectively etched using a plasma formed in an H₂-containing process gas. The etching creates a recessed feature in place of the tin oxide between the surrounding materials. A third material, such as SiO₂ is deposited over the resulting recessed feature without fully filling the recessed feature, forming an air gap.

10 A method for selectively etching tin oxide in a presence of SiO₂, SiC, SiN, SiOC, SiNO, SiCNO, or SiCN, includes, in some embodiments, contacting the substrate with a plasma formed in a process gas comprising at least about 50% H₂. Etching of tin oxide can be performed without using an external bias at the substrate and is preferably performed at a temperature of less than about 100 °C.

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Fig. 2

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