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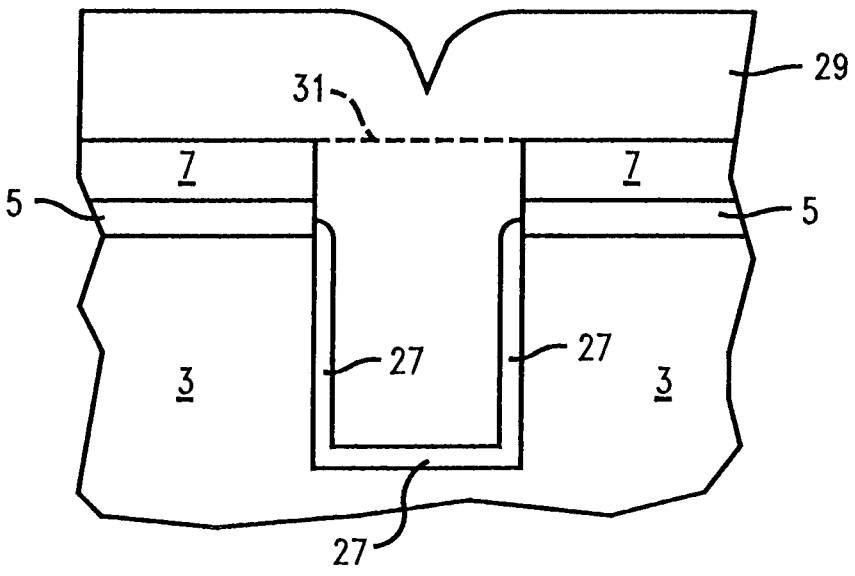
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(54) Title: OXYNITRIDE SHALLOW TRENCH ISOLATION AND METHOD OF FORMATION



(57) Abstract: An oxynitride material is used to form shallow trench isolation regions in an integrated circuit structure. The oxynitride may be used for both the trench liner (27) and trench fill material (29). The oxynitride liner (27) is formed by nitriding an initially formed oxide trench liner. The oxynitride trench fill material (29) is formed by directly depositing a high density plasma (HDP) oxide mixture of SiH_4 and O_2 and adding a controlled amount of NH_3 to the plasma mixture. The resultant oxynitride structure is much more resistant to trench fill erosion by wet etch, for example, yet results in minimal stress to the surrounding silicon. To further reduce stress, the nitrogen concentration may be varied by varying the proportion of O_2 to NH_3 in the plasma mixture so that the nitrogen concentration is maximum at the top of the fill material.

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