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(54) Title: CVD NANOPOROUS SILICA LOW DIELECTRIC CONSTANT FILMS

(57) Abstract

A method and apparatus for depositing nano-porous low dielectric constant films by reaction of a silicon hydride containing compound or mixture optionally having thermally labile organic groups with a peroxide compound on the surface of a substrate. The deposited silicon oxide based film is annealed to form dispersed microscopic voids that remain in a nano-porous silicon oxide based film having a foam structure. The nano-porous silicon oxide based films are useful for filling gaps between metal lines with or without liner or cap layers. The nano-porous silicon oxide based films may also be used as an intermetal dielectric layer for fabricating dual damascene structures. Preferred nano-porous silicon oxide based films are produced by reaction of 1,3,5-trisilanacyclohexane, bis(formyloxysilano)methane, or bis(glyoxylylsilano)methane and hydrogen peroxide followed by a cure/anneal that includes a gradual increase in temperature.

