

Abstract

METHOD OF SILICON OXIDE AND SILICON GLASS FILMS DEPOSITION

A method for fabricating a silicon oxide and silicon glass layers at low temperature using soft power-optimized Plasma-Activated CVD with a TEOS-ozone-oxygen reaction gas mixture (TEOS O_3/O_2 PACVD) is described. It combines advantages of both low temperature Plasma-Enhanced Chemical Vapor Deposition (PECVD) and TEOS-ozone Sub-Atmospheric Chemical Vapor Deposition (SACVD) and yields a coating of silicon oxide with stable and high deposition rate, no surface sensitivity, good film properties, conformal step coverage and good gap-fill. Key features of the invention's O_3/O_2 PACVD process are: a plasma is maintain throughout the entire deposition step in a parallel plate type reactor chamber, the precise RF plasma density, ozone concentration in oxygen and the deposition temperature. These features provide the reaction conditions for the proper O_3/O_2 reaction mechanism that deposits a conformal silicon oxide layer. The process has significant implication for semiconductor device manufacturing involving the deposition of a dielectric over a conducting non-planar surface.

(FIGURE 3 IS SUGGESTED FOR PUBLICATION)