High Density Plasma CVD Technology Development And Challenges

賴建修、鍾翼能

E-mail: 9419700@mail.dyu.edu.tw

ABSTRACT

Plasma-assisted deposition of thin films is widely used in microelectronic circuit manufacturing, Materials deposited dielectrics such as silicon oxide、silicon nitride、and doped silicon glass。 This paper reviews chemical vapor deposition (CVD) applications and techniques for dielectric thin films。 With each device generation, shrinking dimensions and gap-spaces make it more difficult for existing conventional processes to fill the spaces between devices or metal lines without voids。High Plasma Density Chemical Vapor Deposition (HDPCVD) process can deposits high quality silicon dioxide films for sub-half micron, high aspect ratio applications, including inter-metal dielectric (IMD), pre-metal dielectric (PMD) and shallow trench isolation (STI) applications 。For reduce RC delay to improve devices operate speed, HDPCVD deposited fluorine -doped silicon oxide (FSG) film(k=3.5) also be a good alternate, The target generation for this technology is for 0.35 um devices, with extendibility down to 0.10 um devices and beyond。In this paper, I would like to introduce HDPCVD process background and concept, In particular, I would focus on HDPCVD deposited dielectric film application and Process parameters fine tuning 。In the final, HDPCVD reduces process issues and further challenges also would be discussed。

Keywords : CVD、HDPCVD、IMD、STI、PMD、FSG、dielectric

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