Abstract

Method For Forming an Air Gap as a Low Dielectric Constant Material Using Buckminsterfullerene as a Porogen in an Air Bridge or a Sacrificial Layer

A method for reducing RC delay by forming an air gap between conductive lines. A sacrificial layer is formed over a semiconductor structure, filling the gaps between conductive lines on the semiconductor structure. An air bridge layer is formed over the sacrificial layer. The semiconductor structure is exposed to an oxygen plasma, which penetrates through pores in the air bridge layer to react with the sacrificial layer, whereby the sacrificial layer is removed through the air bridge layer. The sacrificial layer and/or the air bridge layer comprise buckminsterfullerene. The air bridge layer can comprise buckminsterfullerene incorporated in an inorganic spin-on material. The buckminsterfullerene reacts with the oxygen plasma and is removed to form a porous air bridge layer. Then the oxygen species from the plasma penetrate the porous air bridge layer to react with and remove the sacrificial layer. The sacrificial layer can comprise buckminsterfullerene incorporated in an inorganic spin-on material, or the sacrificial layer can consist solely of buckminstefullerene. The buckminsterfullerene reacts with the oxygen plasma and is removed through the pores in the air bridge layer.

FIGURE 1 IS SUGGESTED FOR PUBLICATION