ABSTRACT

NOVEL LOW DIELECTRIC CONSTANT MATERIALS FOR COPPER DAMASCENE

Novel low dielectric constant materials for use as dielectric in the dual damascene process are provided. A low dielectric constant material dielectric layer is formed by reacting a nitrogen-containing precursor and a substituted organosilane in a plasma-enhanced chemical deposition chamber. Also, novel low dielectric constant materials for use as a passivation or etch stop layer in the dual damascene process are provided. A carbon-doped silicon nitride passivation or etch stop layer having a low dielectric constatnt is formed by reacting a substituted ammonia precursor and a substituted organosilane in a plasma-enhanced chemical deposition chamber. Alternatively, a silicon-carbide passivation or etch stop layer having a low dielectric constant is formed by reacting a substituted organosilane in a plasma-enhanced chemical deposition chamber. Also, an integrated process of forming passivation, dielectric, and etch stop layers for use in the dual damascene process is described.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)