A METHOD TO FORM ZIRCONIUM OXIDE AND HAFNIUM OXIDE FOR HIGH DIELECTRIC CONSTANT MATERIALS

ABSTRACT

A new method of forming a metal oxide high dielectric constant layer in the manufacture of an integrated circuit device has been achieved. A substrate is provided. A metal oxide layer is deposited overlying the substrate by reacting a precursor with an oxidant gas in a chemical vapor deposition chamber. The metal oxide layer may comprise hafnium oxide or zirconium oxide. The precursor may comprise metal alkoxide, metal alkoxide containing halogen, metal β-diketonate, metal fluorinated β-diketonate, metal oxoacid, metal acetate, or metal alkene. The metal oxide layer is annealed to cause densification and to complete the formation of the metal oxide dielectric layer in the manufacture of the integrated circuit device. A composite metal oxide-silicon oxide (MO_2-SiO_2) high dielectric constant layer may be deposited using a precursor comprising metal tetrasiloxane.

Fig. 3