INTERCONNECT STRUCTURES COMPRISING CAPPING LAYERS WITH LOW DIELECTRIC CONSTANTS AND METHODS OF MAKING THE SAME

ABSTRACT OF THE DISCLOSURE

Interconnect structures comprising capping layers with low dielectric constants and good oxygen barrier properties and methods of making the same are provided. In one embodiment, the integrated circuit structure comprises: an interlevel dielectric layer disposed above a semiconductor substrate; a conductive interconnect embedded in the interlevel dielectric layer; a first capping layer comprising $Si_wC_xN_yH_z$ disposed upon the conductive interconnect; a second capping layer comprising $Si_aC_bN_cH_d$ (has less N) having a dielectric constant less than about 4 disposed upon the first capping layer; and a third capping layer comprising $Si_wC_xN_yH_z$ disposed upon the second capping layer, wherein a + b + c + d = 1.0 and a, b, c, and d are each greater than 0 and less than 1, and wherein w + x + y + z = 1.0 and w, x, y, and z are each greater than 0 and less than 1.

Fig. 1

.