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METHOD FOR FORMING DUAL-LAYER LOW DIELECTRIC BARRIER FOR INTERCONNECTS AND DEVICE FORMED

ABSTRACT



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A method for forming a dual-layer low dielectric barrier on a copper conductor and devices formed are disclosed. A pre-processed substrate (12) that has a copper conductor (38) formed in an insulator layer (36) is first provided. A phosphorus or boron-containing metal alloy film (18) is then deposited on top of the copper conductor as a protection layer. The structure (10) is then heated in a first annealing process. A low k dielectric film (52) is then deposited on top of the phosphorus or boron-containing metal alloy film (18). Th structure (10) is then heated in a second annealing process in a reducing atmosphere. An electrical conductor in a semiconductor structure is disclosed which includes a metal conductor situated in an insulator layer (36) a film (18) on top of the metal alloy film (18). The dual-layer barrier presents superior barrier and adhesion properties.

Figure 1.