A METHOD FOR FORMING CONTACTS AND VIAS WITH IMPROVED BARRIER METAL STEP– COVERAGE

ABSTRACT

A method is described for overcoming the non-conformity and poor step coverage incurred when materials such as metals and barrier materials are deposited into contact or via openings by physical-vapor-deposition(PVD) techniques such as sputtering and evaporation. Conventional PVD deposition into a vertical walled opening results in the formations of cusps along the walls at the mouth of the opening. These cusps obstruct the material stream into the depth of the opening, resulting in inadequate coverage at the base of the opening particularly at the corners. This increases the chance of failure of the barrier material resulting in a reliability exposure. In addition, the cusps, if not removed, cause the formation of voids in subsequently deposited conductive plugs. The invention teaches the insulative layer, wherein the openings are formed, to be deposited to a greater thickness than required by the design. The openings are then formed and filled with a spin-on-glass. The insulative layer is then polished to the design thickness, removing the cusps. The spin-on-glass, which protects the openings from damage and contamination during polishing, is removed and an adhesion layer is applied prior to the deposition of the conductive material of the contact or via.

(Figure 3A is suggested for publication.)