METHOD TO THIN DOWN COPPER BARRIERS IN DEEP SUBMICRON GEOMETRIES BY USING ALKALINE EARTH ELEMENT, BARRIER ADDITIVES, OR SELF ASSEMBLY TECHNIQUE

ABSTRACT

A method of forming a metal plug, comprising the following steps. An etched dielectric layer, over a conductive layer, over a semiconductor structure are provided. The etched dielectric layer having a via hole and an exposed periphery. The etched dielectric layer is treated with at least one alkaline earth element source to form an in-situ metal barrier layer within the dielectric layer exposed periphery. A metal plug is formed within the via hole wherein the in-situ metal barrier layer prevents diffusion of the metal from the metal plug into the dielectric oxide layer.

(Figure 1)