METHODS TO ELIMINATE CONTACT PLUG SIDEWALL SLIT

Abstract

A method to form a barrier layer and contact plug using a touch up RIE. In a first embodiment, we form a first barrier layer over the dielectric layer and the substrate in the contact hole. The first barrier layer is comprised of Ta. A second barrier layer is formed over the first barrier layer. The second barrier layer is comprised of TaN or WN. We planarize a first conductive layer to form a first contact plug in the contact hole. We reactive ion etch (e.g., W touch up etch) the top surfaces using a Cl and B containing etch. Because of the composition of the barrier layers and RIE etch chemistry, the barrier layers are not significantly etched selectively to the dielectric layer. In a second embodiment, a barrier film is comprised of WN.

Figure 8