ABSTRACT OF THE DISCLOSURE

INTERCONNECT WITH COMPOSITE BARRIER LAYERS AND METHODS FOR FABRICATING THE SAME

Composite ALD-formed diffusion barrier layers. In a preferred embodiment, a composite conductive layer is composed of a diffusion barrier layer and/or a low-resistivity metal layer formed by atomic layer deposition (ALD) lining a damascene opening in dielectrics, serving as diffusion blocking and/or adhesion improvement. The preferred composite diffusion barrier layers are dual titanium nitride layers or dual tantalum nitride layers, triply laminar of tantalum, tantalum nitride and tantalum-rich nitride, or tantalum, tantalum nitride and tantalum, formed sequentially on the opening by way of ALD.

(FIG. 1)