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METHOD FOR MAKING LOW-RESISTANCE BARRIER LAYER USING THE COPPER PROCESS

ABSTRACT OF THE DISCLOSURE

A manufacturing method of a low-resistance barrier layer using the copper process is disclosed. By changing the nitrogen-rich reaction gas flux in a physical vapor deposition or chemical vapor deposition, the nitrogen atom concentration contained in the deposited TaN coating decreases from the bottom to the surface, forming a TaN barrier layer with Ta atoms on the surface. Using the disclosed manufacturing method of a low-resistance barrier layer using copper process can combine the structural characteristics of both Ta and TaN so that the barrier layer has simultaneously perfect adhesive and barrier effects, improving the pull-back phenomena in usual copper metal interconnects. This can effectively increase the conductive stability of the multilevel interconnects in IC's using the copper process, promoting its electromigration resistance and the reliability of the products.

FIG. 4



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