METHOD OF FORMING METAL GATE STRUCTURES

OR CMOS DEVICES

ABSTRACT

An embodiment of the instant invention is a method of forming a first transistor having a first gate electrode and a second transistor having a second gate electrode on a semiconductor substrate, the method comprising the steps of: forming a conductive material (step 216 of FIGURE 2) insulatively disposed over the semiconductor substrate, the conductive material having a work function; and altering a portion of the conductive material (step 218 of FIGURE 2) so as to change the work function of the altered conductive material, the conductive material to form the first gate electrode and the altered conductive material to form the second gate electrode. Preferably, the first transistor is an NMOS device, the second transistor is a PMOS device, and the first transistor and the second transistor form a CMOS device. The conductive material is, preferably, comprised of a conductor selected from the group consisting of: Ta, Mo, Ti and any combination thereof. Preferably, the step of altering a portion of the conductive material is comprised of: subjecting the portion of the conductive material to a plasma which incorporates a nitrogen-containing gas.

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