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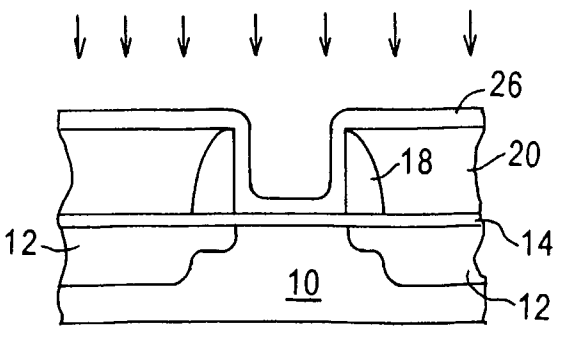
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(54) Title: A METHOD OF FORMING A METAL GATE STRUCTURE WITH TUNING OF WORK FUNCTION BY SILICON INCORPORATION



(57) Abstract: A method for forming a semiconductor structure having a metal gate (30) with a controlled work function includes the step of forming a precursor having a substrate (10) with active regions (12) separated by a channel, a temporary gate (16) over the channel and within a dielectric layer (20). The temporary gate (16) is removed to form a recess (22) with a bottom and sidewalls in the dielectric layer (20). A non-silicon containing metal layer (26) is deposited in the recess (22). Silicon is incorporated into the metal layer (26) and a metal (28) is deposited on the metal layer (26). The incorporation of the silicon is achieved by silane treatments that are performed before, after or both before and after the depositing of the metal layer (26). The amount of silicon incorporated into the metal layer (26) controls the work function of the metal gate (30) that is formed.

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