

**METHOD OF NUCLEATING TUNGSTEN ON
TITANIUM NITRIDE BY CVD WITHOUT SILANE**

Abstract of the Disclosure:

Nucleation of a refractory metal such as tungsten is initiated on a substrate of TiN without the use of silane by introducing hydrogen into a CVD reactor before the introduction of the reactant gas containing the metal, brought to reaction temperature and to reaction pressure. The process is most useful for CVD of tungsten onto patterned TiN coated silicon semiconductor wafers.

Alternatively, hydrogen is introduced in a mixture with the metal containing gas, such as WF_6 , and maintained at subreaction pressure, of for example 100 mTorr, until the substrate is stabilized at a reaction temperature of approximately 400°C or higher, to cause the dissociation of hydrogen on the wafer surface, then elevated to a relatively high reaction pressure of, for example, 60 Torr at which nucleation is achieved. Also, the reduction reaction that deposits the tungsten film proceeds without the need for a two step nucleation-deposition process.

This Sheet Has Been Replaced

