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(54) **PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION METHODS OF FORMING TITANIUM SILICIDE COMPRISING LAYERS OVER A PLURALITY OF SEMICONDUCTOR SUBSTRATES**

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(52) **U.S. Cl.** **438/151**

(58) **Field of Search** 438/151-166,
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(57) **ABSTRACT**

A first cleaning is conducted on a plasma enhanced chemical vapor deposition chamber at room ambient pressure. After the first cleaning, elemental titanium comprising layers are chemical vapor deposited on a first plurality of substrates within the chamber using at least TiCl₄. Thereafter, titanium silicide comprising layers are plasma enhanced chemical vapor deposited on a second plurality of substrates within the chamber using at least TiCl₄ and a silane. Thereafter, a second cleaning is conducted on the chamber at ambient room pressure. In one implementation after the first cleaning, an elemental titanium comprising layer is chemical vapor deposited over internal surfaces of the chamber while no semiconductor substrate is received within the chamber. In another implementation, a titanium silicide comprising layer is chemical vapor deposited over internal surfaces of the chamber while no semiconductor substrate is received within the chamber.

22 Claims, No Drawings