Characterization of Particle Trap Reaction Products in TiN Deposition Processes

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Particle trap reaction product of TiN deposition processes is analyzed to improve the efficiency of particle trap in this work. TiN thin film is considered as a contact / barrier layer, a gate electrode, conductive coatings, wear-resistance coatings and decorative coatings. TiN thin film has good diffusion barrier properties, low electrical resistivity, extreme hardness and optical properties similar to gold. However, one of the issues is pump damage caused by TiN particles, which are generated from the chemical vapor deposition (CVD) step to form the TiN thin film. A trap is used to prevent pump from damages by the TiN particle between a CVD reactor and a pump. TiN film deposited above 500ºC is relatively well characterized. However, reaction products of TiCl4 and NH3 in the temperature range of 200-500ºC is not well characterized in terms of chemical composition and molecular structure. Characteristics of particle trap reaction products of TiN deposition processes are analyzed to find how to reduce the damage of pump in this work. The morphology, structure and composition of accumulation on the surface of trap are examined through the SEM, EDS and XRD.