Abstract

A POST METALLIZATION STRESS RELIEF ANNEALING HEAT TREATMENT FOR ARC TiN COVER

An heat treatment (anneal) process is provided that reduces stress in a metal layer structure having ARC TiN layer overlaying an aluminum layer formed in a high temperature process. An metal layer 32 composed of Al/Cu/Si is sputtered at a temperature of about 505°C on a semiconductor structure 10. Next, an ARC TiN layer 34 is deposited over the metal layer 32. In an important process, a heat treatment (anneal) is performed on the metal layer 32 and the ARC TiN layer 34. The heat treatment comprises three steps. First, a ramp up step is performed wherein the temperature is increased from room temperature to a temperature of about 450 °C at a rate of about 40 °C/sec. Second, a temperature hold step is performed where the temperature is held at about 450 °C for a time of about 30 seconds. Third, a ramp down step is performed where the temperature is ramped down at rate in a range of between about 8 and 10 °C /sec to room temperature. The heat treatment anneal of the present invention reduces the stress between the ARC TiN and Al layers which eliminates any peeling and blemishing of the ARC TiN layer.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)