

A study on the TiN coating applied to a rolling wire probe

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In a rolling wire probe, a key component of an inspection apparatus for PDP electrode patterns, the electric performance of it is known to be strongly dependent on the surface condition of a collet pin, a needle pin, and a wire. However, the collet and needle pins rotate very rapidly in contact with each other, which results in the degradation of the surface by the heat and friction and finally the formation of black wear marks on the surface after a several hundred hours test. Once the black wear marks appear on the surface, the electric resistance of the probe increases sharply and so the integrity of the probe is severely damaged.

In this experiment, TiN coating, which has excellent electric conductance and good wear-resistance, has been applied on the surface of collect and needle pins for preventing the surface damages. In order to achieve the homogeneous coating with a good adhesion property, special coating substrate stages and jigs were designed and applied during coating. TiN has been deposited using 99.999% Titanium target by a DC reactive sputtering method. According to the components and jigs, processing parameters, such as DC power, RF bias and the flow rate ratio of Ar and N₂ used as reactive gases, has been controlled to obtain good TiN films. Detailed problems and solutions for applying the new substrate stages and jigs will be discussed.