

유도결합 플라즈마를 이용한 TiN 박막의 식각 특성 연구

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The etch characteristic of TiN thin films by using inductively coupled plasma

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Abstract : Titanium nitride has been used as hardmask for semiconductor process, capacitor of MIM type and diffusion barrier of DRAM, due to its low resistivity, thermodynamic stability and diffusion coefficient. Characteristics of the TiN film are high intensity and chemical stability. The TiN film also has compatibility with high-*k* material.

This study is an experimental test for better condition of TiN film etching process. The etch rate of TiN film was investigated about etching in BCl₃/Ar/O₂ plasma using the inductively coupled plasma (ICP) etching system. The base condition were 4 sccm BCl₃ /16 sccm Ar mixed gas and 500 W the RF power, -50 V the DC bias voltage, 10 mTorr the chamber pressure and 40 °C the substrate temperature. We added O₂ gas to give affect etch rate because O₂ reacts with photoresist easily. We had changed O₂ gas flow rate from 2 sccm to 8 sccm, the RF power from 500 W to 800 W, the DC bias voltage from -50 V to -200 V, the chamber pressure from 5 mTorr to 20 mTorr and the substrate temperature from 20 °C to 80 °C.

Key Words : TiN, BCl₃/Ar/O₂, etching