

# A Study on the Optimazation of Ag Thin Film on MgO(100) Substrate by DC Magnetron Sputtering Method

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## 1. 서론

In recent years, resonant enhancement of the tunneling conductance is expected from calculation for Fe/Ag/MgO/Fe junction. TMR oscillates as a function of Ag interlayer thickness between positive values in excess of 2000% and negative values of the order of -100%. The resonant enhancement occurs because the Ag interlayer creates potential steps for electrons in both the ferromagnetic and antiferromagnetic configurations of the junction. It offers the possibility of tuning the magnitude and sign of the TMR by the choice of the interlayer thickness. In this study, we explained about note of Ag interlayer by DC magneton sputtering method.

## 2. 실험방법

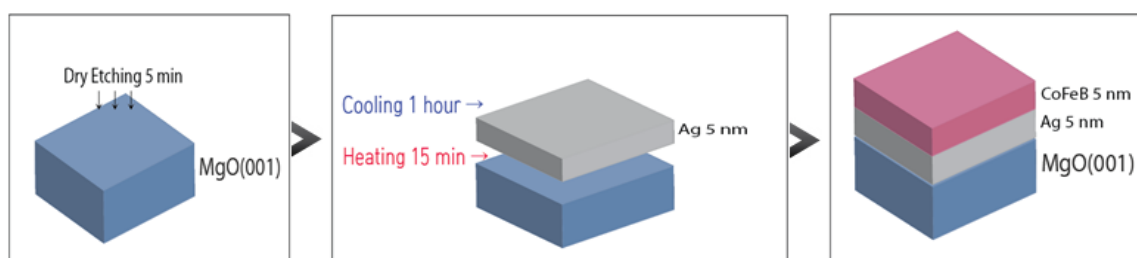


Fig. Schematic picture of the structure by DC magneton sputtering

The MgO substrate has been cleaned in situ by dry etching process and then the Ag layer has been deposited on the substrate by varying the sputtering conditions such as sputtering power, gas pressure, deposition temperature etc.

## 3. 실험결과

The results showed that the crystallinity of the Ag layer was enhanced by increasing the deposition temperature by XRD but surface roughness becoms worse.

## 4. 고찰

MTJ needs not only high crystallization but also flat layer. So we must have to consider both of them.

## 5. 결 론

While depositing Ag, the surface roughness formed is island shape rather than flat shape in thin film. And crystallization will be increased during heat treatment, but roughness becomes worse.

## 6. 참고문헌

- [1] Theory of resonant spin-dependent tunneling in an Fe/Ag/MgO/Fe(001) junction, Phys. Rev. B 80, 024415 (2009)