

# **Electromagnetic properties of Co / Al-oxide / Co tunneling junction**

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## **1. Introduction**

In recent years, Ferromagnet / Insulator(semiconductor) / Ferromagnet junctions have been studied in order to clarify the effect of tunneling through the insulating barrier. And this has received attention. That is because these layers are expected to offer wide opportunities as magnetic sensors or magnetic heads and so on.<sup>[1-3]</sup> Here we present a study of Co/Al-oxide/Co structures, I-V characteristics and MR behavior for tunneling through the junction with varying the thickness of Al-oxide and controlling temperature.

## **2. Experimental**

The tunneling junctions were grown on a Si wafer by using a molecular beam epitaxy(MBE). Tantalum mask was utilized for the cross construction of two ferromagnetic electrode layers and a insulator. The active area of tunneling junction was changed for getting different I-V and MR values.

## **3. Results and discussion**

From this study, we obtained the result that the tunneling current increases exponentially with increasing the voltage and a different MR effect is obtained, which is related to the Al-oxide thickness, the spin structure of Co, the active area of junction and the temperature.

## **[Reference]**

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