

Adul Dearamea 2011: Study of Al-Cu Thin Film Deposited by RF Sputtering Process. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Associate Professor Supreya Trivijitkasem, Dr.Ing. 92 pages.

Al, Cu and Al-Cu thin films were deposited on glass slides by RF sputtering process with typically based pressure of 2×10^{-5} mbar and the deposited argon pressure of 8×10^{-3} mbar. 99.9% purity of Al and Cu targets of 3 in diameter, 0.188 in and 0.318 in thickness, respectively, were used. The deposition power was 170, 180, 190 and 200 W and the deposition time was 1.5, 3.0 and 4.5 h. The results showed that the thickness and the deposition rate of the film increased as deposition power and deposition time. At a given deposition power and deposition time, the thickness and the deposition rate of the Cu thin film were higher than Al thin film.

The Al-Cu thin film were obtained by deposited Cu thin film on Al thin film at the same deposition power and 3 h deposition time. X-ray diffraction, XRD was applied to examine the microstructure of Al-Cu film which annealed at 200, 300, 400 and 500 °C for 5, 10 h. It was found that each Al-Cu thin film showed diffraction peak of (111) plane of Al phase. The Al-Cu thin film deposited at 170, 180, 190 and 200 W, annealed at 200 °C for 5, 10 h showed diffraction peak of (112) plane of Al_2Cu phase at Bragg angle, $2\theta \approx 42.85^\circ$ with the grain size $D_{112} \approx 73$ nm. The grain size and the intensity of (112) diffraction peak increased as the increased deposition power which annealed at 200 °C for 10 h.

Resistivity of the Al-Cu thin film determined from 4 point-probe method showed that the resistivity decreased as the increased deposition power, annealed temperature and annealed time. The Al-Cu thin film deposited at 200 W, annealed at 200 – 500 °C for 10 h provided lower resistivity ρ of 1.1 – 1.6 m Ω .m.

Student's signature

Thesis Advisor's signature