

Chirawat Klunrat 2007: Study of Si Thin Film Deposited by DC Sputtering and RF Sputtering Processes. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Associate Professor Supreya Trivijitkasem, Dr.Ing. 65 pages.

Silicon thin films were deposited by DC and RF sputtering processes in vacuum chamber with base pressure of typically  $2 \times 10^{-5}$  mbar. A Si target, 7.620 cm diameter and 0.318 cm thickness, with a nominal purity of 99.9% was used. The Si films were deposited on quartz at an argon pressure of  $8 \times 10^{-3}$  mbar. Three deposition powers were used: 100, 150 and 200 W. The deposition times were varied from 1 - 3 hours. The results showed that, at a giving deposition power and a giving deposition time, DC sputtering process provided faster deposition rate and thicker Si film than RF sputtering process.

After annealing Si films at 700, 800, 900 and 1000 °C for 5, 10 and 20 hours, the microstructure of the Si films was examined by SEM and XRD. It was found that DC sputtering films showed better crystallinity than RF sputtering film. Higher crystallinity was obtained at higher deposition power, annealing temperature and annealing time.

The crystallite grain sizes of the film, calculated from Sherrer's equation, gave the same results as crystallinity. Bigger grain sizes was found in DC sputtering film than RF sputtering film.

Chirawat Klunrat

Student's signature

Supreya Trivijitkasem

Thesis Advisor's signature

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