

Aluminum Ion Implantation Using a Variable Energy RFQ Implanter, K. AMEMIYA, J. ITO, K. TOKIGUCHI, Hitachi Ltd., Ibaraki - High energy aluminum ion implantation is studied for power semiconductor device fabrications. A new MeV implanter system using a variable energy RFQ linac is developed, and is tested for pulse mode operation. This system consists of a high current multiply charged ion source with a crucible for metal ion production, a sector type mass separator, a magnetic quadrupole triplet, a variable energy RFQ linac, a bending magnet, and an implantation chamber. The RFQ system is driven by an rf resonance circuit having an external variable inductance type coil, and is tuned so that the acceleration energy of aluminum ions is 0.9 MeV. Repetition and pulse width of the beam are 1 Hz and 500 ms, respectively. The ions are implanted into a silicon wafer, and the depth profile and dose uniformity are measured. Results show that more than 8 hour's operation is possible using this implanter system, and the depth and dose uniformity are 1.35 micron and 0.7 %, respectively. This system is useful for fabrication of semiconductor devices.