Surface passivation property of aluminum oxide thin film on silicon substrate by liquid phase deposition

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ABSTRACT
The passivation layer of Al$_2$O$_3$ thin films prepared by liquid phase deposition on p-type (100) silicon substrate are investigated. The deposition solution of aluminum sulfate and sodium bicarbonate are used for Al$_2$O$_3$ thin films deposition. The concentration of the sodium bicarbonate in the deposition solution controls the deposition rate of Al$_2$O$_3$ thin films. The optimum condition is a pH value of deposition solution of 3.3 and annealing at 500 °C in N$_2$ atmosphere for 30 min. The effective minority carrier lifetime and fixed oxide charge density are 124.51 μs and $-2.15 \times 10^{12}$ cm$^{-2}$. Compared with bare silicon substrate, the effective minority carrier lifetime has increased by 41 times after the Al$_2$O$_3$ passivation layer deposition.

Keywords: Passivation; Liquid phase deposition; Aluminum oxide

REFERENCES