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High rate and high yield silicon deposition under mesoplasma condition for a next generation Siemens technology[1] MAKOTO KAMBARA, JUNICHI FUKUDA, SUDONG WU, LIWEN CHEN, TOYONOBU YOSHIDA, Department of Materials Engineering, The University of Tokyo — Silicon thick films have been deposited by mesoplasma CVD with trichlorosilane (TCS) as source gas. The deposition rate of the Si films is found to increase linearly with the TCS flow rate, epitaxial films are deposited at a maximum rate of 200 nm/sec on silicon wafer as a substrate at low TCS flow rate up to 80 sccm. In contrast, when the TCS flow rate increases to 100 sccm, polycrystalline films were deposited instead at a rate of $\sim$500 nm/sec. It is noteworthy that the deposition efficiency of such films reaches roughly >20% for epitaxy and >80% for polycrystalline films, which has proven the expectation from the thermodynamic consideration under mesoplasma condition.

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