Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Lateral epitaxial overgrowth of silicon thick films during nanocluster assisted mesoplasma CVD MAKOTO KAMBARA, TESURO KOYANO, YUSUKE IMAMURA, TOYONOBU YOSHIDA, The University of Tokyo, THE UNIVERSITY OF TOKYO TEAM — Mesoplasma epitaxy has been applied to the deposition on a SiO_2 masked Si wafer to identify the feasibility of lift-off and layer transfer of the thick epitaxial films. Under a certain deposition condition, the Si epitaxial film was deposited over the patterned mask with 4 m width. The surface topography on patterned mask has revealed that the epitaxial film grows laterally over the pattern from the Si window and its lateral epitaxial overgrowth (LEO) rate is 4-5 times faster than the vertical growth rate and reaches 2500 nm/sec at the trichlorosilane flow rate of 100 sccm. Growth model was developed, assuming the surface diffusion of the nanoclusters-constituent Si atoms on the mask surface and and also that the Cl etching effect of both SiO2 and Si. The model reproduces reasonably the LEO tendency and identified the shorter diffusion length of 127 nm than that of the conventional CVD, as the unique LEO mode with cluster assisted epitaxy. Furthermore, as predicted by the model, the deposition at greater TCS rates successfully produces LEO on the pattern with wider 8m mask width as a result of LEO coverage before completion of the mask etching.

Makoto Kambara
The University of Tokyo

Date submitted: 10 Jun 2016 Electronic form version 1.4