

Ga-Catalyst GaAs Nanowires grown on Silicon by HVPE

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Hydride Vapour Phase Epitaxy (HVPE) is the only III-V semiconductor crystal growth process working close to equilibrium. Gold Catalyst-assisted GaAs nanowires (NWs) growth from HVPE shown a constant cylinder shape over unusual growth rate (170 $\mu\text{m}/\text{h}$) and free of crystal defects.^{1,2} However, using of gold like catalyser harms the properties of semiconductors by causing for example the deep-level trap sites.

Our recent work reveals the formation of *in-situ* Ga-assisted catalyst-free GaAs NWs by HVPE deposited on patterned silicon wafer for the first time. Gallium liquid catalyst NWs had shown morphology curved and randomly distributed, with diameters of around 80 nm. These NWs present a surprisingly fast solidification rate as more than 1000 $\mu\text{m}/\text{h}$ on account of lower growth temperature (600 $^{\circ}\text{C}$). A discussion based on thermodynamics will be proposed.

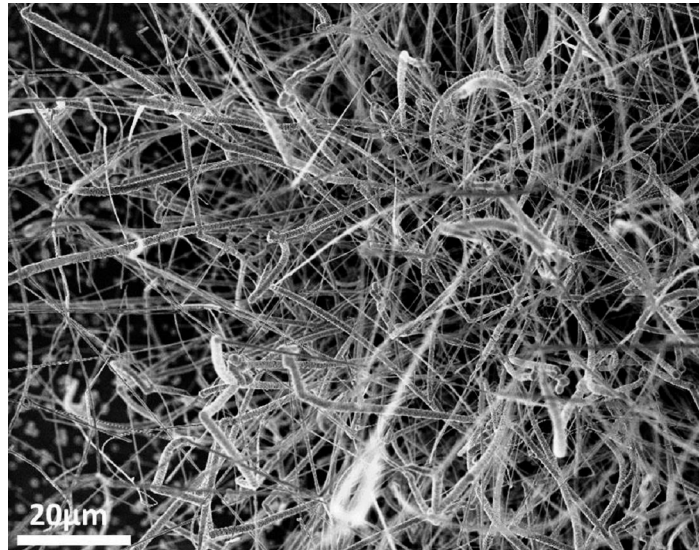


Figure 1: SEM image of Ga-assisted GaAs NWs on Silicon

References

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