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[\[Semiconductor\]\[International Cooperation\] Taiwan Presents New Semiconductor Manufacturing Process,  
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[Semiconductor][International Cooperation] Taiwan Presents New Semiconductor Manufacturing Process,  
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RTI, Awakening News Networks & udn.com (2010/11/17) The international research project in which Taiwan takes a significant part just presents an important breakthrough in semiconductor manufacturing process. The research team from National Tsing Hua University tells the public on November 17, with the epitaxial layer transfer technology, the research team has succeeded in transferring several compound semiconductor materials onto silicon substrate and realizing the insulating layer coating on compound semiconductor. This breakthrough will greatly benefit the following studies and developments on optical transmission. The result of the research has been published in Nature.

Taiwan takes more than sixty percent of the global market share of semiconductor with silicon substrate. After the announcement of the 40-nano process into mass production stage made by TSMC, the company is now developing methods for the mass production of 32-nano process and even 22-nano process, trying to hold the lead.

However, the manufacturing technological development has come to the bottleneck. Silicon coating on insulators is the most practicable solution among others by now, but how to integrate the compound semiconductor materials with the silicon coating process has caused the scientists and the industry a lot of mental fatigue.

To conquer the challenge, the team from National Tsing Hua University, led by Assistant Professor Yu-Lun CHUEH at the Department of Materials Science and Engineering, cooperates with the team from University of California, Berkeley, led by Associate Professor Ali JAVEY at the Department of Electrical Engineering & Computer Sciences, and the team from The University of New Mexico, led by Professor Sanjay KRISHNA at the Electrical and Computer Engineering Department. The international team uses epitaxial layer transfer technology to transfer various types of compound semiconductor materials onto the silicon substrate, successfully realizing the insulator coating of the compound semiconductor materials.

The team uses a molecular beam epitaxy system to pile up indium (In) particles and gallium (Ga) particles on the substrate materials, forming a thin film on them, and then produce an InGaAs nano-belt with photolithography process.

Yu-Lun CHUEH said, this technology realizes the integration between optical and electronic components and silicon substrate materials without any junction treatment, and it is also advantageous with regard to its higher substrate utility rate, higher operation speed of the components, lower energy consumption of the components and the nanoization of components sizes. Most of all, the technology succeeds in resolving the integration difficulty of the silicon processing of the compound semiconductor materials. This is regarded as a big breakthrough in semiconductor manufacturing process.

Related website:

<http://www.nature.com/nature/journal/v468/n7321/abs/nature09541.html>

Reference:

[RTI 2010/11/17](#) (Chinese)

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