

Combinatorial Nanostructure Fabrication with High Precision Control and High Throughput Developed by COMET

An Interview with A Japanese Start-up

Abstract:

NanoGlobe conducted site visit and interviewed the founder and CEO of COMET, a Japanese nanotech start-up spun off from a national lab that developed a proprietary high-throughput deposition technology for combinatorial thin films using moving mask system. COMET's unique deposition technology allows high throughput, precision (up to 1 atomic layer) controlled and automatic ternary and binary composition in one system. This capability allows COMET to produce unique materials for high performance battery, high efficient CIGS solar cells, high k dielectric for non-volatile memory devices and other exciting applications in energy and IT fields.

COMET stands for Combinatorial Materials Exploration and Technology, which is a venture company spun off from National Institute for Material Science (NIMS) located in Tsukuba, Japan to commercialize the high throughput deposition technology for the combinatorial thin films developed by Dr Toyohiro Chikyow and his team of scientists. Our team conducted a site visit (while we were at Tsukuba participating at the TIA Nanotech International Workshop during Feb. 15-16, 2010) at their office and laboratory located inside NIMS and interviewed its founder Dr Toyohiro Chikyow and CEO Dr. Setsu Suzuki. COMET enjoys very attractive incentives from NIMS to keep its operation cost low the last 3 years since it was founded in 2007 including low rental fee, access to NIMS equipment and infrastructure as well as expertise from the team of researchers involved in the research project. Patents related to combinatorial synthesis issued by NIMS are licensed to COMET exclusively.

Using the combinatorial composition spread synthesis system with moving mask system developed by COMET integrated with a Plasma Layer Deposition (PLD) system and Ion Beam Sputtering systems or multi-target sputtering systems, COMET is able to deliver high throughput, precision (up to 1 atomic layer) controlled and automatic ternary and binary composition within one platform. This capability allows COMET to produce unique materials with lower cost and higher efficiency for high performance battery, high efficient CIGS solar cells, high k dielectric for non-volatile memory devices and other exciting applications in energy and IT fields.

COMET is able to produce ZnS epitaxial layer on transparent substrate of a solar cell enabling high efficient CIGS solar cells up to 19% efficiency. COMET is in the process of scaling up its production to 4" wafer this year and plans to move up to 6" or 8" wafers by 2013. "We are able to produced C-doped

HfO₂ materials as the charge storage layer in the Non-volatile RAM (NV-RAM) devices, electronics is stored in HfO₂:C just like water in sponge, which are very effective in high integration and lower power consumption”, explained Dr Suzuki, CEO of COMET. COMET is also working towards providing materials fabrication process for NV-RAM to tool makers.

COMET is currently working with some major automobile companies to provide materials design and production for their new generation high performance battery. Its business strategy will not only focus on contract research for industry customers, but also machine sales, direct proprietary materials sales. “We are keen to establish overseas partnership to expand our business globally”, Dr Chikyow stressed during our interview. COMET is currently seeking distributors and contract manufacturer in Singapore and Asia region. For more information about COMET, please visit <http://www.comet-nht.com/>



(Left) Group photo of Dr Lerwen Liu (Managing Director of NanoGlobe), Dr Setsu Suzuki, (President & CEO of COMET) and Dr Ken-ichiro Takahashi (Senior Researcher of COMET) after NanoGlobe’s site visit and interview;
(Right) Dr Lerwen Liu introduced Dr Chikyow, founder of COMET to Singapore EDB senior officers to discuss COMET’s business opportunities to in Singapore.