NEWS RELEASE

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Realization of Controlled n-Type Doping of β-Ga_2O_3 Homoepitaxial Layers via a Proprietary MOVPE

Key Technology for Mass-Production of Next-Generation Power Devices

A research group led by Prof. Yoshinao Kumagai of Tokyo University of Agriculture and Technology, in collaboration with Mr. Junya Yoshinaga of TAIYO NIPPON SANSO CORPORATION, Assistant Prof. Shogo Sasaki of Nara Women's University, Prof. Takeyoshi Onuma of Kogakuin University, Prof. Masataka Higashiwaki of Osaka Metropolitan University / National Institute of Information and Communications Technology, and Dr. Yuzaburo Ban of TAIYO NIPPON SANSO ATI CORPORATION, has successfully developed a technique for precise control of n-type conductivity in high-speed growth of β-Ga_2O_3 homoepitaxial layers using their proprietary low-pressure hot-wall MOVPE method.

β-Ga_2O_3 has been attracting attention as a next-generation semiconductor material for power devices that enable efficient power control and conversion. In the present study, non-toxic and non-explosive tetramethylsilane (TMSi) gas was employed for the first time as the Si dopant source, and by supplying it together with trimethylgallium (TMGa) and O_2, precursors for gallium and oxygen, respectively, Si-doped β-Ga_2O_3 homoepitaxial layers were grown with conductivity (Si concentration) precisely controlled over a wide range (Further details can be found in the published article). This achievement has made it possible to fabricate wafers with thick homoepitaxial layers having controlled n-type conductivity by the MOVPE method, and is expected to accelerate the development of power devices.

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The research results have been published online in the English-language journal *Applied Physics Express* (*APEX*) on May 20.
Title of paper: Homoepitaxial growth of thick Si-doped β-Ga_2O_3 layers using tetramethylsilane as a dopant source by low-pressure hot-wall metalorganic vapor phase epitaxy
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◆Contact information for inquiries about the research◆

Yoshinao Kumagai
Tokyo University of Agriculture and Technology
E-mail：4470kuma@cc.tuat.ac.jp

Junya Yoshinaga
TAIYO NIPPON SANSO CORPORATION
E-mail：yoshinagaj.qed@tn-sanso.co.jp

Shogo Sasaki
Nara Women's University
E-mail：ssasaki@cc.nara-wu.ac.jp

Takeyoshi Onuma
Kogakuin University
E-mail：onuma@cc.kogakuin.ac.jp

Masataka Higashiwaki
Osaka Metropolitan University / National Institute of Information and Communications Technology
E-mail：higashiwaki@omu.ac.jp / mhigashi@nict.go.jp

Yuzaburo Ban
TAIYO NIPPON SANSO ATI CORPORATION
E-mail：bany.qtu@tnati.tn-sanso.co.jp