

Abstract Submitted  
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**Analysis of gallium nitride (GaN) surface interacted with chlorine etching plasma beams** SHANG CHEN, Nagoya University, RYOSUKE KOMETANI, KENJI ISHIKAWA, HIROKI KONDO, KEIGO TAKEDA, HIROKI KANO, YUTAKA TOKUDA, MAKOTO SEKINE, MASARU HORI, NAGOYA UNIVERSITY TEAM, PLASMA NANOTECHNOLOGY RESEARCH CENTER, NAGOYA UNIVERSITY TEAM, NU ECO ENGINEERING CO., LTD. COLLABORATION, AICHI INSTITUTE OF TECHNOLOGY COLLABORATION — To improve electronic performance of the next generation GaN devices, plasma processes is an essential issue to stoichiometric composition and damage creation of the GaN surfaces. But the detail information according plasma internal parameter was insufficient. In this study, we analyze GaN surface stoichiometry by in situ x-ray photoelectron spectroscopy (XPS) after treated by chlorine (Cl<sub>2</sub>) inductively coupled plasma (ICP) etching system and radical ion flux ratio controllable novel plasma-ion-beam system. During exposure of chlorine plasma, surface was chlorinated under ordinary circumstance. With nitrogen radical irradiated the significant change of chlorinated surface residues was observed. As a results, under high etch-rate and radical-rich conditions, surfaces such after the ICP etching exhibited N-rich but for ion-rich conditions to Ga-rich. This indicated that surface state was strongly related to radical-ions ratio, nitrogen contained reaction products and an amount of chlorinated surface residues.

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