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Real-time monitoring of GaN films in processing plasma YOSHITSUGU BANNNO, YOSHITAKA NAKANO, DAISUKE OGAWA, KEIJI NAKAMURA, Chubu University — The use of plasma is expected when fabricating devices on a gallium nitride (GaN) substrate. However, the plasma can make some significant damages that are caused by irradiating particles etc., in particular, high-energy ions generated in the plasma. In order to understand the mechanism to create these damages, we so far utilized photoluminescence (PL) emissions from the GaN film to make real-time monitoring of any changes relating to optical properties of the film that was exposed in the plasma. In this presentation, we will show our preliminary measurements with PL from the GaN exposed in argon or argon-chlorine plasma. Argon plasma is expected to give physical damages, while chlorine-containing plasma is expected to give both physical and chemical damages. Our measurements showed that the exposure in argon plasma degraded PL emission property from the GaN film, while the exposure of chlorine-containing plasma did not. This is likely because the speed of chemical reactions (etching) was simply faster than the speed of creation of physical damages according to our thickness measurement. Our presentation will give the following results from the real-time monitoring measurements.

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