平成 19 年度第 4 回 VBL セミナー

(4th VBL Seminar, 2007)

日時： 平成 19 年 11 月 22 日(木) 13 時 30 分～15 時 00 分

場所： 名古屋大学フロンティアプラザ（VBL）4 階セミナー室

Date: Thursday 22, November 2007, 13:30-15:00

Place: Seminar room, 4th floor, Frontier Plaza (VBL)

Title: Growth of III-Nitride Semiconductors by Mixed-Source Hydride Vapor Phase Epitaxy

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We performed the growth of III-nitride semiconductors by the mixed-source hydride vapor phase epitaxy (HVPE) method in which the metal-chlorides were formed by the reaction of HCl gas with mixed form of group III metals. For the growth of AlGaN layers, mixed form of gallium (Ga) and aluminum (Al) metals were used for the reaction of metal-chloride sources. We could control the Al composition of the AlGaN layers from 0.6% to 80% by the variation of source zone temperature. For the growth of conductive III-nitride semiconductors, tellurium (Te) was used as n-type doping material in GaN and AlGaN layers in the mixed-source HVPE. For the case of GaN layers, the maximum carrier concentration was 8X1018cm-3. Mixed form of indium (In) and gallium (Ga) metals were used as metal-chloride sources for the growth of InGaN layers. Optical properties of the InGaN layers were investigated by cathodoluminescence (CL) measurement. We fabricated non-phosphor white LED structures which have InAlGaN active layers by using of multi-bin sliding graphite boat in the mixed-source HVPE system. With the addition of indium into the AlGaN active layers, the electroluminescence (EL) spectrum became broadened over the whole visible range. We could also make InGaN micro-structures by the mixed-source HVPE on sapphire and silicon substrates. The size and shapes of the InGaN micro-structures were dependent on growth temperature. Especially for the case of r-plane sapphire, nano-sized hexagonal pillars could be obtained.

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