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Effects of total gas velocity on properties of undoped GaN epitaxial layer grown on sapphire (0001) substrate by MOCVD

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We have investigated the effects of total gas velocity during the growth of undoped GaN epitaxial layer in a horizontal MOCVD reactor. The samples were grown for the total gas velocity range of 0.31-0.69m/s. The total gas velocity were changed by the flow rate of the H_2 push gas with 0.7, 1.4, 2.1 and 2.8 slm. For the samples with flow rates of 0.7 and 2.8 slm, the donor-acceptor pair emission observed. I_2 emission was blue-shift for changes from 2.8slm to 1.4 slm. And then I_2 emission was red-shift for changes push gas flow rate from 1.4 to 0.7slm. The full width at half maximums of (002) and (102) rocking curves by high resolution X-ray diffractometer were decreased with increasing flow rate. The hall electron mobility of undoped GaN for 0.7 slm flow rate was 113 cm^2/V s.