infiTOF Application Note

Reaction gas analysis on Nitride Semiconductor by using “infiTOF”

infiTOF

Nitride semiconductors are candidate materials for high-power transistors. To achieve high breakdown voltage performance, the GaN drift layer must be grown with the lowest amount of impurities possible.

Amano Laboratory of Nagoya University studies the vapor phase reaction by in-situ monitoring in a MOVPE reactor using infiTOF[1)].

TMG reacts with ammonia to produce methane (CH_4), but NH_2 which is typical fragment of ammonia (NH_3) is interfered because their nominal mass is 16 (m/z16). infiTOF can completely separate these two peaks. This indicated the availability of observing CH_4 signals in the presence of ammonia.

Furthermore infiTOF with high mass resolution can separate H_2O (m/z18.1056), $^{15}NH_3$ (m/z18.02359), NH_4 (m/z18.3437) which have the same nominal mass of 18 (m/z18).

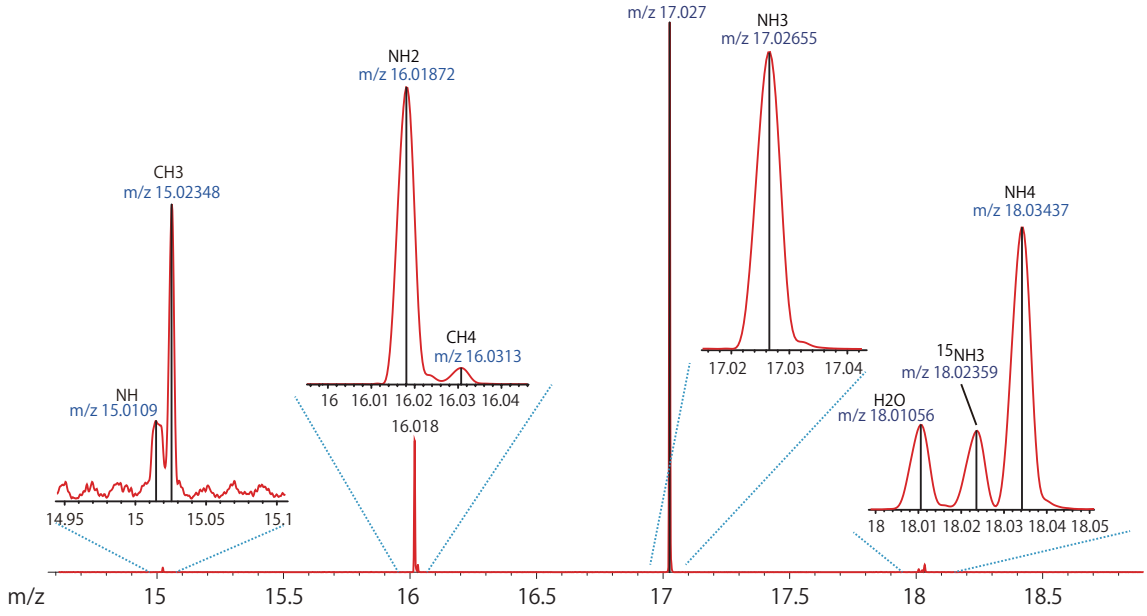

Fig.1 Mass spectrum of reaction products of NH_3, CH_3 & H_2O in reaction gas

1) Shugo Nitta, Kentaro Nagamatsu and Hiroshi Amano et al, Ext. Abstr. IWN2016
PS1.48 In-Line NH3 Reactant Analysis on Nitride Semiconductor Metalorganic Vapor Phase Epitaxy via High-Resolution Mass Spectrometry

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