

# **In-situ Etching of InP-based Materials in MOVPE Reactor using PCl<sub>3</sub>**

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InP based materials have several advantages in optoelectronics and microelectronics devices. The rise of the sophisticated device based on these materials and their integration involve more steps of etching and regrowth during the fabrication. Detailed control of the fabrication is highly important to improve the performances. Etching in-situ, in a growth reactor is a very attractive approach in order to reduce the technological processing steps and to improve the device performances.

In this study we investigated Pcl3 in-situ etching in a MOVPE reactor for various materials, InP, InGaAs(P), In(Ga)AlAs, in wide range of etching conditions. Detailed control of the vertical and lateral etching as well as the revealed crystallographic planes as function of growth condition has been achieved. The optimized etch condition were applied to in-situ etch mesa strips for buried device structures. In addition, we have used in-situ etching to clean up before growth the surface of the processed wafers, to improve the selectivity in selective area growth (SAG) and to suppress the overgrowth in the edge of the SAG mask. Details and results of these studies will be described.