

商品紹介

Metal-organic chemical vapor deposition (MOCVD) system “UR25KRRC” with automatic substrate transfer system

自動基板搬送機構付 MOCVD 装置”UR25KRRC”

1. Introduction

The Taiyo Nippon Sanso Corporation (TNSC) has been developing the metal-organic chemical vapor deposition (MOCVD) system “UR25K” (reactor capacity: 6 inch × 7 wafers) for mass-production of nitride semiconductor devices since the early 2000s. The UR25K has advantages, such as wide range of growth pressure and high-speed growth [1], by which high-performance devices can be fabricated. Recently, the TNSC has developed a new system “UR25KRRC”, which is a UR25K with an automatic substrate transfer system (a cassette-to-cassette (CtoC) system), to conserve labor and improve yield (Fig. 1).

2. CtoC system of “UR25KRRC”

Manual loading/unloading of the substrates were required for every epi-growth in the operation of the conventional UR25K. The UR25KRRC was designed by adding a CtoC system to the UR25K. Automatic transfer of the substrates to the susceptor using the CtoC system is performed in three steps: 1) The substrates are transferred from the in-cassette box (Fig. 2) to the aligner by the robot (Fig. 3). 2) The substrates are transferred to a wafer-holder from the aligner. 3) The substrates are placed onto the susceptor by the wafer holder. The epi-growth is performed after placing the susceptor in the reactor. Finally, the epi-wafers are arranged in the out-cassette box by the same transfer system. From loading to unloading of the substrates, this sequence can be automatically executed as one operation and repeated continuously.



Fig. 1 UR25KRRC system



Fig. 2 Typical in-cassette box



Fig. 3 Robot and aligner for substrate transfer

3. Features of “UR25KRRC”

The footprints of the UR25K and the UR25KRRC systems are 12 m² and 13 m², respectively. The addition of the CtoC was thus realized by minimizing the increase in footprint. In addition, the housing of the UR25KRRC has an I-shaped appearance, which allows more efficient usage within the space of a clean room. It was confirmed that the epi-growth performances of the nitride semiconductor layers were maintained even after the addition of the CtoC system. The UR25KRRC is expected to improve production efficiency and contribute to the fabrication of advanced technologies such as micro-LEDs and vertical-cavity surface-emitting lasers (VCSELs), which are attracting attention in the field of semiconductor development.

Reference: [1] Koh Matsumoto, Compound Semiconductor Magazine, March 2014, pp. 38-43

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