

中台灣奈米技術科學與工程核心設施計畫---子計畫 III :

子計畫三：彰師大部分(II)

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摘要

在持續第二年的計畫執行中：(一) 我們已完成測試並進行服務之機台兩部；(二) 即將馬上進行安裝之儀器設備一部。已完成測試及進行服務的機台為第一年採購之兩件重要的核心設施，該兩件設施分別是用於深蝕刻矽晶片之電漿耦合活性離子蝕刻機及合成二氧化鈦奈米管之具備紅外線光譜分析之高壓反應爐。前者已展示 200 奈柱狀結構且具 20 比 1 的高深寬比能力，此設備之建立不僅加強及補足彰化師大在奈米製程上的能力及研發能量，對於中部微機電（奈米機電）研究專長之同仁提供了預期中相當多的服務。而二氧化鈦奈米管的合成也提供國內多所學校同仁研究之用。延續第一年彰化師大對此奈米核心設施計畫之支持（國科會支持設備費六百八十萬，而彰師大配合三百七十萬）。在第二年的採購過程中，彰師大校方展現充沛之配合度，挹注八百萬於分子束磊晶機台（國科會員核定七百萬，既配合款超過百分之百）。因此，採購程序得以順利，並洽談到最佳的廠牌儀器。預計今年六月可以進行安裝及測試。相信這些機台將發揮應有的

功能，對彰師及中部同仁提供絕佳的服務。同時以目前的進度及校方的重視和支持，我們可已具備成一個國家級的奈米製程中心的雛形。

關鍵字：核心設施;電漿耦合活性離子蝕刻機;

高壓反應爐;分子束磊晶機台

Abstract

Continuing from the first year of this three-year project, two major achievements have been reached: (1) two pieces of instruments purchased in the first year have been installed and tested, and they have been in service for some time ever since; and (2) one piece of molecular beam epitaxy machine purchased in the second year is to be installed next month. For the two pieces of instruments purchased in the first year they are inductively coupled plasma reactive ion etcher(ICP RIE) for the deep etching of silicon (Alcatel AMS 100SE) and high pressure reactor equipped with FTIR for the synthesis of TiO₂ tube, respectively. The former has shown capability of having 200 nm diameter and 4 μm depth of silicon pillar, which plays an important role in the field of MEMS/NEMS and it has served the central community well. Also, the TiO₂ tube grower has served nation-wide community with good reputation. As was defined in the joint project, the mission at National Changhua University of Education (NCUE) is focused on the nanofabrication process, in which four pieces of core facilities were proposed to enhance and compensate the fabrication capability existed at NCUE. Therefore, in order to facilitate and speed up the whole process a matching fund for over 50 % of the funded budget was put into this project for the first, namely extra 3.7 million NTD from our university (NCUE) was added on the top of the 6.8 million NTD funded from NSC. Furthermore, more matching fund was added in the second year (8 million NTD from our university was added to the 7.1 million funded from NSC) for purchasing a versatile molecular beam epitaxy machine, which is expected to be installed in June (next month). Based on the progress we have made so far, we believe that a national level of

nanofabrication facilities can be established in the near future.

Key words: Core facilities;Inductively coupled plasma reactive ion etcher;High pressure reactor;Nanofabrication;Molecular beam epitaxy