



## GaP/Si Antiphase domains annihilation at the early stages of growth

Rozenn Bernard, Yanping Wang, Mounib Bahri, Thanh Tra Nguyen, Ronan Tremblay, Tony Rohel, Karine Tavernier, Antoine Létoublon, Simon Charbonnier, Pascal Turban, et al.

### ► To cite this version:

Rozenn Bernard, Yanping Wang, Mounib Bahri, Thanh Tra Nguyen, Ronan Tremblay, et al.. GaP/Si Antiphase domains annihilation at the early stages of growth. Summer School of the French Epitaxy Network, Sep 2015, Porquerolles, France. hal-02497252

HAL Id: hal-02497252

<https://hal.science/hal-02497252>

Submitted on 3 Mar 2020

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# GaP/Si Antiphase domains annihilation at the early stages of growth



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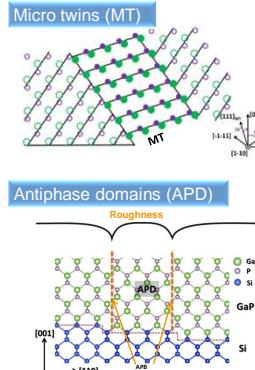
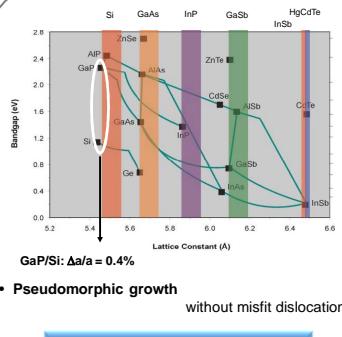
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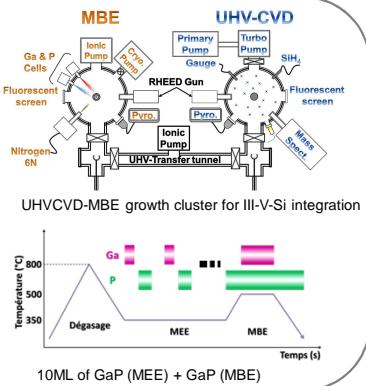
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## Introduction

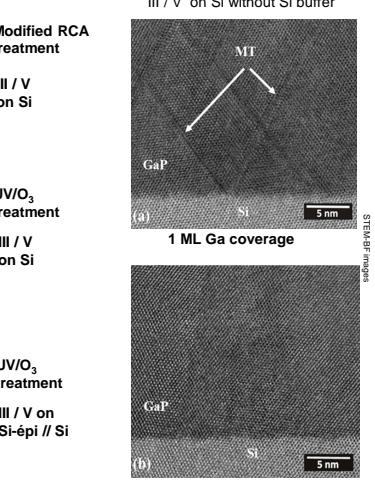
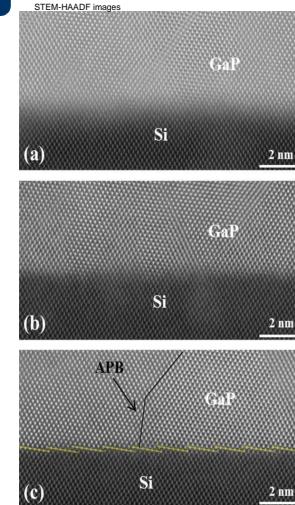
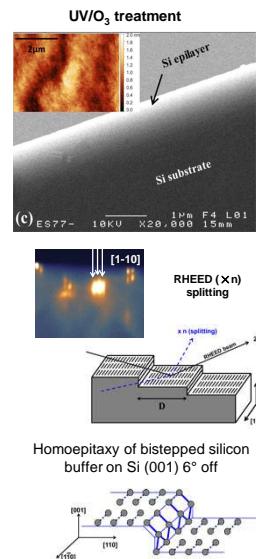
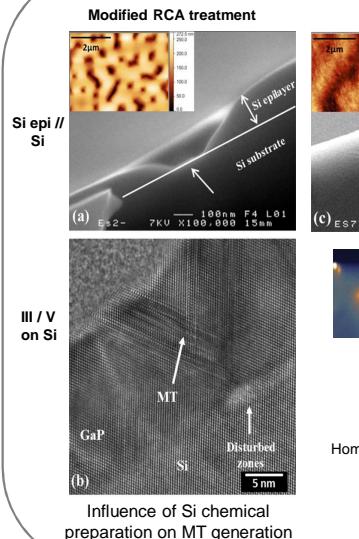


## Solutions

- Clean and flat interface (free if contaminants)
- Control of the first monolayer of GaP
- Bisteped silicon surface (Si (001) 6° off)
- III / V growth conditions



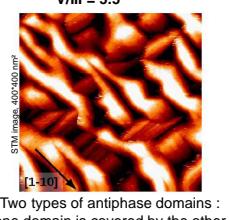
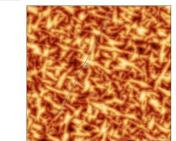
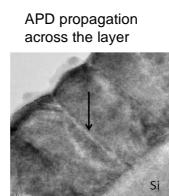
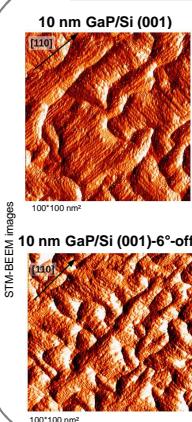
## GaP/Si interface : MT generation, and abruptness



Influence of growth conditions on MTs

Y. Ping Wang et al., Appl. Phys. Lett., submitted (2015).

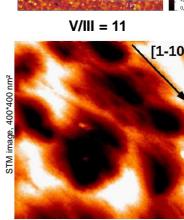
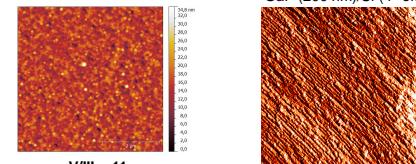
## Influence of APB propagation and V/III flux ratio



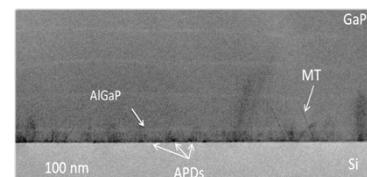
Roughness induced by APDs  
Vicinity of the Si substrate influences GaP growth

Two types of antiphase domains : one domain is covered by the other

GaP (200 nm)/Si (6° off)



Early annihilation of antiphase domains



High V/III flux ratio seems to favor the annihilation of APD. Obtention of monodomains of GaP.

## Conclusions & Perspectives

- MTs and abruptness of GaP/Si interface : sensitive to chemical preparation and improved by the use of a bisteped Si buffer . BUT antiphase boundaries are still observable.
- High V/III flux ratio tends to favor APD annihilation at the early stages of growth.

Perspectives : Detailed study of the influence of the growth parameters is required to understand these observations (ANR Antipode).