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Title MOCVD epitaxy of GaAs/Ge heterostructures

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Abstract Compound semiconductors such as GaAs are becoming increasingly important in advanced technologies because of their intrinsically higher speeds, lower power requirements, optoelectronics applications and greater resistance to high energy radiation. Present paper deals with the growth of epitaxial GaAs layers by MOCVD and their subsequent characterization in terms of electrical and optical behavior. Silane and dimethyl-zinc were used as n- and p- type dopants respectively, while varying the growth temperature, V/III ratio and hydrogen flow rates. Electrochemical C-V profiler was used to carry out the depth profiling of doped samples. The impurity concentrations were homogeneous along the depth and exhibited good interfaces. Detailed discussion is presented in the direction of band gap shrinkage due to Zn and Si incorporation in p-type and n-type GaAs respectively, while interpreting the results in terms of vacancy control model. Discussion is further extended to close process-property correlation and their impact on the heterostructure behavior. Abstract no. A9824-8115H-024B9812-0510D-134.

Identifers MOCVD epitaxy. GaAs/Ge heterostructure. compound semiconductor. doping. electrochemical C-V profiling. impurity concentration. band gap. vacancy. GaAs:Zn-Ge. GaAs:Si-Ge

Subjects doping profiles
elemental semiconductors
energy gap
gallium arsenide
germanium
III-V semiconductors
semiconductor epitaxial layers
semiconductor growth
semiconductor heterojunctions

vacancies (crystal)
vapour phase epitaxial growth

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|---|---|
| Classification Codes | A8115H ; A6855 ; A6170W ; B0510D ; B2530B ; B2550B ; B2520D |
| Chemical Indexing | GaAs:Zn-Ge/int GaAs:Zn/int GaAs/int As/int Ga/int Ge/int Zn/int GaAs:Zn/ss As/ss Ga/ss Zn/ss GaAs/bin As/bin Ga/bin Ge/el Zn/el Zn/dop. GaAs:Si-Ge/int GaAs:Si/int GaAs/int As/int Ga/int Ge/int Si/int GaAs:Si/ss As/ss Ga/ss Si/ss GaAs/bin As/bin Ga/bin Ge/el Si/el Si/dop |
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