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Spectroscopic ellipsometry and electrical characterizations of InGaAs:Mg thin films lattice matched to InP

By: Zeydi, I (Zeydi, I.)^[1]; Ezzedini, M (Ezzedini, M.)^[1,2]; Sayari, A (Sayari, A.)^[3,4]; Shalaan, E (Shalaan, E.)^[5]; Wageh, S (Wageh, S.)^[5,6]; Sfaxi, L (Sfaxi, L.)^[1,7]; Al-Ghamdi, AA (Al-Ghamdi, A.)^[5]; M'Gaieth, R (M'Gaieth, R.)^[1]

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Abstract

Mg-doped InGaAs films were grown at 560 degrees C lattice matched to InP semi-insulating substrate by metalorganic vapor phase epitaxy (MOVPE) under various Cp2Mg flow conditions. Hall effect, photoluminescence (PL), high-resolution X-ray diffraction (HR-XRD) and spectroscopic ellipsometry (SE) are the tools used in this work. The crystalline quality and the n-p conversion of the InGaAs:Mg films are described and discussed in relation to the Cp2Mg flow. Distinguishing triple emissions peaks in PL spectra are observed and seem to be strongly dependent on the Cp2Mg flow. SE was used to investigate the interband transitions in InGaAs:Mg/InP heterointerfaces and the different critical point energies were identified.

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Author Information

Reprint Address: Sayari, A (reprint author)

+ Univ Jeddah, Fac Sci, Dept Phys, POB 80327, Jeddah 21589, Saudi Arabia.

Reprint Address: Sayari, A (reprint author)

+ Fac Sci Tunis, Dept Phys, Equipe Spectroscopie Raman, Campus Univ, Tunis 2092, Tunisia.

Addresses:

- + [1] Monastir Univ, Lab Microoptoelect & Nanostruct, Monastir, Tunisia
- [2] CENA, KACST Intel Consortium, Riyadh, Saudi Arabia
- + [3] Univ Jeddah, Fac Sci, Dept Phys, POB 80327, Jeddah 21589, Saudi Arabia
- + [4] Fac Sci Tunis, Dept Phys, Equipe Spectroscopie Raman, Campus Univ, Tunis 2092, Tunisia
- + [5] King Abdulaziz Univ, Fac Sci, Dept Phys, POB 80203, Jeddah 21589, Saudi Arabia
- + [6] Menoufia Univ, Fac Elect Engr, Phys & Engr Math Dept, Menoufia 32952, Egypt
- + [7] Sousse Univ, High Sch Sci & Technol Hammam Sousse, Sousse, Tunisia

E-mail Addresses: amor.sayari@laposte.net

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