Accepted Manuscript

Ac conductivity and dielectric behavior of a−Si: H/c−Si_{1-y} Ge_y/p−Si thin films synthesized by Molecular Beam Epitaxial method

Emna Kadri, Khaled Dhahri, Amira Zaafouri, Monem Krichen, Mohammed Rasheed, Kamel Khirouni, Régis Barillé Moltech-Anjou

PII: S0925-8388(17)30555-8

DOI: 10.1016/j.jallcom.2017.02.117

Reference: JALCOM 40845

To appear in: *Journal of Alloys and Compounds*

Received Date: 5 December 2016

Revised Date: 8 February 2017

Accepted Date: 11 February 2017

Please cite this article as: E. Kadri, K. Dhahri, A. Zaafouri, M. Krichen, M. Rasheed, K. Khirouni, R.B. Moltech-Anjou, Ac conductivity and dielectric behavior of a−Si: H/c−Si_{1-y} Ge_y/p−Si thin films synthesized by Molecular Beam Epitaxial method, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.02.117.

Ac conductivity and dielectric behavior of $a-Si:H/c-Si_{1-y}Ge_y/p-Si$ thin films synthesized by Molecular Beam Epitaxial method.

Emna.Kadri*[a], Khaled.Dhahri*[a], Amira.Zaafouri[c], Monem Krichen[a], Mohammed.RASHEED[c], Kamel.Khirouni[b] , RÉGIS BARILLÉ MOLTECH-Anjou[d]

[a]Laboratory of Applied Physics, Sfax Faculty of Science, University of Sfax, B. P. 1171, 3000 Sfax, Tunisia.

[b]Applied Physics Laboratory of materials and nanomaterials in the environment, Faculty of Science Gabes, University of Gabes, City of Erriadh, 6079 Gabes, Tunisia.

[c]Condensed Matter Laboratory, University of Sfax, Faculty of Sciences B.P. 1171, 3000, Sfax-TUNISIA

[d]University Angers/UMR CNRS 6200, 2 Bd Lavoisier, 49045 Angers, France

*Corresponding author:

emna_kadri@yahoo.fr

khaleddhahri88@yahoo.fr

Abstract

In this work, a thin film SiGe was synthesized by the solid source Molecular Beam Epitaxy and identified by X-ray diffractometry and Raman spectroscopy. The effect of the Ge fraction on the structural, electrical conduction and relaxation was studied in detail using impedance analysis. The results of the modulus study reveal the presence of two distinct relaxation processes suggesting the presence of grains and grain boundaries in the sample. The value of exponent *'s'* calculated from the plot of log (σ) versus log (w) ranges 0.32-0.8 suggested that the conduction phenomena in the studied samples pursue hopping conduction. The impedance data were well fitted by two equivalent electrical circuits and confirms the presence of two distinct relaxation processes. The results indicate that the SiGe thin films fabricated by this method are applicable for SiGe-based electronic and optical devices. Moreover, fabrication of high quality SiGe thin films on Si thin film enables the application in solar cell.

Keywords: Impedance spectroscopy; Modulus; Ac conductivity, Dielectric properties; thin films.