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# Ac conductivity and dielectric behavior of a – Si: H/c – Si<sub>1-y</sub> Ge<sub>y</sub>/p – Si thin films synthesized by Molecular Beam Epitaxial method.

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## 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.

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