

**“Analysis of electrical, dielectric and thermal performance of NiFe/SiO₂/Si
MOS device fabricated by liquid phase epitaxy”**

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Abstract

Herein, the electrical, thermal and dielectric properties of NiFe/SiO₂/Si capacitor fabricated by liquid phase epitaxy were investigated. The temperature dependence of I-V and C-V characteristics were performed in the temperature range of 303- 398 K and frequency range of 1 KHz-10 MHz. The influence of temperature on ideality factor, series resistance and barrier height were studied. The results revealed that the MOS device followed the thermionic emission phenomenon. The C-V characteristics were found to be sensitive to frequency and bias voltage. The interfacial density of states N_{ss} decreased with increasing temperature. This behavior can be ascribed to the molecular restructure with increasing temperature and thus the reordering of the interface. The dielectric results revealed that the dielectric constant ϵ' , dielectric loss ϵ'' , loss factor $\tan\delta$, electric modulus M' , M'' and ac conductivity σ_{ac} exhibit strong temperature and frequency dependence. The prepared device was found to exhibit direct relationship between responsivity and DC voltage bias with maximum responsivity of 1.7×10^{-5} A/K at 3 V.

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