

An Evaluation of Electric Field of the Space Charge Region and Energy Band Gap of LSMO/Si Heterojunction under Applied Bias Voltage



Sanjay Kumar

PGT Department of Physics, Sahyogi +2 School,
Hajipur (Vaishali), Bihar, India

ABSTRACT

This paper presents the brief studies of electric field of space charge region and energy band gap of LSMO/Si heterojunction under applied bias voltage. Using the drift-diffusion model [J. Qin et. Al. EPL. 79, 57004 (2007)]. We have theoretically evaluated the semi conductor energy band gap and electric field at the interface region of the heterostructure with various bias voltages. We have studied the transport property of LSMO/Si heterojunction. We have shown the typical XRD pattern of a 500 nm thick LSMO film growing directly on the Si(001) substrate. We have presented the experimental and theoretical result of I-V curves of the LSMO/Si heterostructure over the temperature range of 250-300K. The values of the electric field in the space charge field under positive bias of 0.4V are smaller than without bias. Our theoretically calculated results indicate that the proposed band structure is valid for the interpretation of the transport property of the P-N junction heterojunction made of $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ and Si.

Keywords : Heterojunction, Drift-Diffusion Model.