

Electrical resistivity and metal-nonmetal transition in cubic GaN:Si and InN:Si epitaxial layers

J.R.L Fernandez ¹, **A. Ferreira da Silva** ², J.R.Leite ¹, A. Tabata ¹, Bo E. Sernelius ³, E. Abramof ⁴, V.A.Chitta ¹, C. Persson ⁵, D.J.As ⁶, T. Frey ⁶, D. Schikora ⁶, and K. Lischka ⁶

¹ Instituto de Física, Universidade de São Paulo, CP66318, 05315-970 São Paulo, SP, Brazil

²Instituto de Física, Universidade Federal da Bahia, Campus Universitário de Ondina, 40210 340 Salvador, Bahia, Brazil

³Department of Physics and Measurement Technology, Linköping University, SE-581 81 Linköping, Sweden

⁴Instituto Nacional de Pesquisas Espaciais (INPE-LAS), CP 515, 12201-970 São José dos Campos, SP, Brazil

⁵Department of Physics, Uppsala University, SE-751 21 Uppsala, Sweden

⁶Universität Paderborn, FB-6 Physik, D-33095 Paderborn, Germany

The electrical resistivity of the Si-donor systems GaN and InN is investigated from room temperature down to 10K. The resistivity presents a metallic character above a certain impurity concentration. The model calculation is carried out from a recently proposed generalized Drude approach. The critical impurity concentration N_c for the metal-nonmetal transition is estimated from this result and calculated using the dielectric function model with a Lorentz-Lorenz correction and chemical potential as well.