

13,16

Impurity Effects on Nucleation and Growth of SiC Clusters and Layers on Si(100) and Si(111)

© J. Pezoldt¹, M.N. Lubov², V.S. Kharlamov³

¹ Institut für Mikro- und Nanotechnologien,
Ilmenau, Germany

² Saint Petersburg Academic University,
St. Petersburg, Russian Federation

³ A.F. Ioffe Physical-Technical Institute of RAS,
St. Petersburg, Russian Federation

E-mail: joerg.pezoldt@tu-ilmenau.de

Received: July 16, 2019

Revised: July 16, 2019

Accepted: July 1, 2019

A kinetic Monte Carlo model of silicon carbide growth on silicon surface is proposed. Based on this model, the growth of silicon carbide clusters on silicon in the presence of a pre-deposited impurity of various types: attractive and repulsive, is studied. The density of silicon carbide clusters on silicon is calculated. Calculations of the dependencies of the silicon carbide clusters density on the impurity mobility are carried out. The process of redistribution of the species in the multi-component C|Ge|Si structure during annealing is studied in the framework of the kinetic approach. Concentration profiles of the structure components are determined.

Keywords: silicon surface, silicon carbide, interface, impurity, kinetic Monte Carlo, rate equation.