

Growth mechanism of ErSi₂/Si(111)

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Variation of Schottky barrier height for various metal/silicon contact is one of the unsolved problems in semiconductor physics. Since ErSi₂/Si system reveals an abrupt interface with the Schottky barrier height of 0.3eV and low electrical resistivity, the study of the growth mechanism of ErSi₂/Si(111) has drawn attention recently. We have studied the geometric and electronic structure of the silicide as a function of Er coverage using scanning tunneling microscopy. A chemisorbed Er layer is formed on the Si(111) surface at submonolayer coverage. With increasing coverage, a $\sqrt{3} \times \sqrt{3} R30^\circ$ structure begins to appear after annealing and grows laterally. The silicide begin to form as island leaving bare Si(111)-7x7 in between them, when annealed above 1000K. The growth kinetics and electronic structure for the different phases will be discussed.