

SELF-ASSEMBLY OF SILICIDE QUANTUM DOTS ON STEPPED SILICON SURFACES BY REACTIVE EPITAXY

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Abstract:

Reactive epitaxy of Co on vicinal Si(111) surfaces is found to be a flexible and convenient method for the preparation of a dense array of Co silicide quantum dots. The motivation of this study is the technological interest in transition metals silicide that can be used as low-resistivity interconnects and future nanoscale contacts. In the present work, submonolayer amounts of Co were deposited on diverse vicinal and flat Si surfaces, analysing the resulting silicide structure by scanning tunnelling microscopy. The use of vicinal Si(111) surfaces with a narrow terrace width of around 40 Å is found to be the key for the formation of self-assembled silicide quantum dots with a regular size and distribution function. This situation contrasts with the growth of Co found on flat Si(111), where nanocluster structures are notably scarce and multiple phases are found.