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Thermal evolution of Fe on $Ge(111)-c(2\times8)$ surface and the effect of $(\sqrt{3}\times\sqrt{3})$ Ag-Ge buffer layer TSU-YI FU, HUNG-CHANG HSU, MING-KUAN JHOU, JIA-YUAN WU, Department of Physics, National Taiwan Normal University — Using scanning tunneling microscopy, two systems of Fe deposition on a clean $Ge(111)-c(2\times8)$ surface and surfaces with a $(\sqrt{3}\times\sqrt{3})$ $R30^o$ Ag-Ge buffer layer were compared. Complex surface alloy structures were easily formed on Fe/Ge systems through annealing at 300-650 K. On clean Ge (111) surfaces, similar surface morphology evolution was observed when two different amounts of Fe were deposited. To reduce the complexity, $(\sqrt{3}\times\sqrt{3})$ $R30^o$ Ag-Ge interface were used as buffer layers. The growth morphologies differed in the presence and absence of the buffer layers. After heat treatment to 570 K, (2×2) reconstruction platform islands were formed in the Fe/Ge system, which transformed to three-dimensional (3D) islands at 640 K. With Ag buffer layer, only nanoparticle growth occurred and 3D islands were formed early at 570 K. Generally, $\sqrt{19}$ ring clusters increased to break the order $c(2\times8)$ reconstruction by increasing the temperature and disappeared at 640 K in Fe-Ge system, but only $\sqrt{7}$ ring clusters appeared at 390 K with $(\sqrt{3}\times\sqrt{3})$ $R30^o$ Ag-Ge buffer layer.

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