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Metal Induced Crystallization of Polycrystalline Silicon Germanium: The Morphological Study Between Nickel and Copper

Abstract

In this study, metal induced crystallization technique is used in to obtain the lower temperature point in crystallization. Two different metals with one non-metal configuration as a baseline i.e. SiGe/Ni, SiGe/Cu and SiGe. A simple metal-assisted chemical etching method is used to fabricate the Si nanopillar, with Ag acting as a catalyst. Following by deposition of metal namely nickel (Ni) and copper (Cu) then undergo thermal annealing from 200 °C until 1000 °C to improve the crystallinity of the Ge layer. Morphological studies of surface area were conducted using scanning electron microscopy (SEM). The results show that the crystallization temperature of SiGe with Ni was obtained at 400 °C while the crystallization temperature of SiGe without any metal was obtained at 600 °C. Meanwhile the crystallinity, for SiGe/Cu only occurs in very low level where the structure did not change until the annealing was conducted at 600 °C. Based from these result, it is proved that the metal can help lowering the crystallization temperature and improving the defects of SiGe © 2023 American Institute of Physics Inc.. All rights reserved.