Study on the solid state reaction between Co/Ni bilayer film and silicon substrate

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Abstract

Billayers of pure Cobalt and nickel films were evaporated alternatively on (100) monocristalline silicone substrate. After annealing, in a vacuum furnace from 300 to 800°C during 20 min, the growth sequence of the phase's formation that evolved as the result of the diffusion of Co or Ni in Si was examined by means of X-ray diffraction (XRD) and Scanning electron microscopy (SEM). The reaction sequence began with the formation of Ni_2Si at temperature of 300°C and was followed by the formation of Co_2Si on top of the Ni_2Si. As the temperature rose up to 500°C the layer of Ni_2Si completely transformed into NiSi and the formation of $(Ni_xCo_{1-x})Si_2$ ternary silicide occurred, the temperature of formation of this later was relatively lower compared with those of the $NiSi_2$ and $CoSi_2$ disilicide and present a low resistivity as the results of sheet resistance provided.

Keywords :Thin films; nickel silicides; X-ray, XRD.