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 Ni2Si at temperature of 300°C and was followed by the formation of Co2Si on top of the Ni2Si. As the temperature rose up to 500°C the layer of Ni2Si completely transformed into NiSi and the formation of (NixCo1-x)Si2 ternary silicide occurred, the temperature of formation of this later was relatively lower compared with those of the NiSi2 and CoSi2 disilicide and present a low resistivity as the results of sheet resistance provided.

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