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Study of nickel silicide by X- ray diffraction

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Abstract : In order to understand fully the results from X-ray diffraction oscattering analysis, it is benefecial to understand the interactionsbetween X-rays and matter. X-ray methods are generally nondestructive, in that sample preparation is not required, and they canprovide a very appropriate route to obtain structural information onthin films and multilayers. Analysis can be performed across thewhole spectrum of material types from perfect single crystals toamorphous materials.In this work, X-ray diffraction was involved to study the formationof crystalline nickel silicide phases. For this purpose, Ni nanometricthin films were deposited on Si (100). XRD technique have shownthat the NiSi silicide is the predominant phase at 350°C. For theannealed samples at 500°C, only NiSi monosilicide is detectedWhen the annealing temperature increases to 750°C the NiSi2disilicide is the main formed phase. The obtained samples wereanalyzed using scanning electron microscopy (SEM), it show asurface morphology depending strongly on the substrateorientation.

Keywords : thin film, nickel silicides, X-ray, XRD