

A Competitive Diffusion Of Titanium And Palladium Atoms In Ti/Pd/Si And Pd/Ti/Si Annealed Ternary Systems

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Abstract:

The alternative deposition of two metal layers, titanium and palladium on a mono-crystalline silicon substrate, provided two ternary systems. The whole systems were subjected to a vacuum heat treatment, the annealing temperatures ranged from 200 °C up to 950°C by steps of 50°C and with an annealing time being fixed to 30 min. Furthermore, the characterization of the obtained samples was carried out by various techniques, namely: RBS, XRD and the Scanning Electronic Microscopy (SEM) with its incorporated technique of Dispersal in Energy of the X-rays (EDS).

The enhanced inter-diffusion between the various elements and the resulting combination of substantial different phases' formation were evidenced.

The main purpose of this work is to provide versatile properties of the multiple obtained silicides onto the same substrate; on the other hand the surface composition was investigated. Furthermore, this may have some relevance to the problems of contact materials in devices.

Keywords: ternary System, interdiffusion, morphology, RBS, XRD, SEM and EDS.

References:

- [1].S.S. Lau, W.F. Van Der Weg, in J.M. Poate, K.N. Tau, J.W. Mayer (Eds), Thin films Interdiffusion and Reaction, Princeton, New Jersey, 1978, Chap. 12.
- [2] S.P. Murarka : Silicides for VLSI Application, Academic Press London, 1983,Chap 1
- [3] C.Benazzouz, H.Hammoudi, N.Benouatas, S.Tobbeche and A Bouabellou: Study on the solid state reaction between bilayered Pd/Au films and Silicon substrates/*Vacuum*-Vol 81, Issue 4 (2006) Pages (489-493).
- [4] A.Hammoudi, C.Benazzouz, S.Tobbeche, N.Benouattas and N.Boukhalifa
"Study of the on-surface diffusion of the ternary system Au/Pd/Si (111)"
Materials Science Forum Vol. 609 (2009) pp 161-165
- [5] A.H.Hammoudi , A.H.Benyagoub, C. Benazzouz, C.A. Pineda-Vargas and M. Nkosi
"Compositional microanalysis of the obtained Copper Silicide from an annealed ternary system Cu/Au/Si by Standard RBS, Microprobe PIXE, XRD and EDS." In press (Proceedings- CIMA LIBANON 2011)