

Auto-correlation function analysis of phase formation in the initial stage of interfacial reactions of titanium thin films on (001)Si

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Abstract

Auto-correlation function analysis has been applied to the high resolution transmission electron microscope images of amorphous interlayers formed in the interfacial reactions of ultrahigh vacuum deposited titanium thin films on (001)Si. No silicide phase was found to form in the as-deposited samples. On the other hand, Ti_5Si_3 , TiSi , and Ti_5Si_4 were found to form simultaneously under certain annealing conditions. The intermediate silicide phases were found to form earlier than that of the previous study. The distribution of these silicide phases in the amorphous interlayers was also demonstrated. Metastable free energy diagram was constructed to predict the phase formation of silicides.