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Initial stage of CdTe on Si(211) grown by MBE

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We have investigated initial growing stage of CdTe on Si(211) wafer.

Firstly, CdTe(211)B epilayer is grown on a Si(211) substrate to the thickness of $6\mu\text{m}$ by using Molecular Beam Epitaxy(MBE) and it is investigated by using Scanning Electron Microscope(SEM), Atomic Force Microscopy(AFM) and X-ray diffraction(XRD). It is found out that CdTe(211)B surface morphology have the root mean square(RMS) of 150\AA by AFM analysis and full width half maximum(FWHM) of 150 arcsec by XRD.

We've annealed the sample by increasing temperature from RT upto 1073K and investigated by Auger Electron Spectroscopy(AES) and Low Energy Electron Diffraction(LEED). It shows that the CdTe is removed from Si(211) substrate perfectly after annealing for 30min on 773K and the Te atom is removed between 773K and 873K . this result is different from CdTe(111)B/Si(100) in which CdTe is removed on 773K by annealing for 2 hours and Te is not removed on 923K . The LEED pattern[Fig. 1(a)] shows hexagonal and bare Si(211)[Fig. 1(b)] pattern appeared on 873K and all of the spot disappeared on 1073K .

In summary, the bonding energy between Te and Si in Te/Si(211) is lower than that of Te/Si(100) and Te/Si(211) surface has hexagonal superstructure.

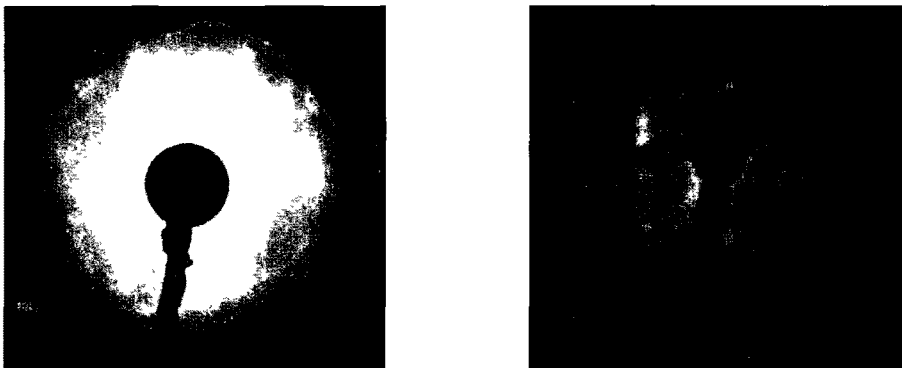


Fig. 1 The LEED pattern of (a) Te/Si(211) surface and (b) clean Si surface