Formation of Au Nanostructures and Sputtering of Ionic Water Clusters by Method Molecular Dynamic Simulation

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Emission of water clusters M(H2O)n , where M denotes positive ion, from ice films frozen on metal substrates bombarded by energetic particles was studied by a molecular dynamics technique. Our results shows that the preferred orientation of water molecules around a central cation, however, is similar to the orientation around a central water molecule, i.e., the cation in water does not introduce a large perturbation and the hydrogen bond network retains its structural identity near the cation. Also was studied formation of nanostrutures in target during the bombardment. These results are interesting for mass spectrometry of molecules, study of nanostructures, surfaces and biological molecules.

Temperature Dependence of Dark Current of pSi–n$(Si_2)_{1-x}(CdS)_x$ Structures

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The research of influence of isovalent impurity on electric and photo-electric properties of semiconductors where formative with semiconductor continuous solid solutions (CSS) of substitution presents both the fundamental and the applied application interest at the area of material science and photoelectrical properties of semiconductors.

In the given work results of experimental researches (Si2)1-x(CdS)x epitaxial layers grown on c-Si substrates by a method liquid phase epitaxy are presented. The grown layers had thickness and ~ 10 micron, n-type of conductivity with specific resistance 0,016 Ohm cm.

Dependences of the dark current of pSi–n(Si2)1-x(CdS)x structures have been investigated at various values of a bias voltage. In experiment it was observed anomaly dependence of current. The current with arising of temperature begun monotonously aroused and reached some minimal value at temperature 100 C and then again starts to arise up to temperature 200 C.

Arising of dark current is caused of the band-to-band thermal generation of electron-hole pairs. The voltage drop at the temperature 100 C is caused by the recharging of impurity atoms CdS. It is known, that width of the forbidden band of CdS Eg,CdS=2,48 eV more than Eg,Si=1,1 eV. Covalent bond of atoms CdS is stronger than Si-Si bond. However, when the molecule of CdS replaces two atoms of silicon in tetrahedral lattice of silicon the bonds of Cd–S become weak under influence of surrounding atoms of silicon. It causes to occurrence impurity level CdS located on Ei=1,2 eV below a valence band top of silicon. The generation of electron-hole pairs with participation of CdS impurities at the 100 C temperature is occurred under action thermal phonons. However, holes formed on impurity levels are localized and they will be recombination centers. Therefore drop of the dark current caused by dispersion of carriers on impurity centers.