

## Atomic structure of amorphous carbon deposited by various incidence angles –MD simulation study

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Amorphous carbon films have a variety of potential applications. In most such applications film properties are crucial and highly dependent on the film growth conditions. We here investigate the atomic structure of the films, which is generated at various incidence angles, using the classical molecular dynamics. Varying incidence angle of the deposited carbon atoms, different level of sp hybridization and porosity of the film are captured in our model. As the incidence angle becomes glancing, subplantation of the deposited carbon in vertical direction is significantly reduced, rather bouncing back of the incident carbon with slight modification of surface structure is mainly occurred at the early stage of the film growth. As the surface becomes rougher, shadowing effect at these glancing incidences also becomes more significant, which tends to cause asymmetrical and columnar structure. We describe incidence angle dependence of the evolution of the atomic structure of the film and its corresponding properties.