The Simulation of Continuous Se Ion Beam Assisted Deposition of CIS Films

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Based on the continuous Se ion beam assisted magnetron sputtering deposition technology, low temperature deposition of CIS thin-film solar cells in high quality can be achieved. By comparing with the method of conventional gas phase atomic deposition, and through simulated analysis from the perspective of diffusion uniformity, numerical calculation on the depth of ion beam injection effect is conducted. First, according to the theory of classical collision in molecular dynamics, the theoretical calculation on the process of ion implantation is done; the concentration distribution of the Se after ion implantation can be got by TRIM software simulation analysis. On this basis, the concentration distribution of Se ion after diffusion can be further obtained. Finally, the calculation model is established; through comparison and analysis, when the Se diffusion uniformity phase at the same time, sink temperature T1 needed for ion beam assisted deposition and sink temperature T2 needed for gas phase atomic deposition are respectively calculated. The calculation results show that on the premise of merely considering the ion implantation effect, from the perspective of the diffusion of uniformity, the Se ion beam assisted deposition technique can obviously reduce the temperature of the basal values compared with traditional vapor deposition technology.

Keywords
ion beam assisted deposition
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