

C-Si based solar cells: Doped homo and heterojunction structures to dopant free carrier selective contacts based hetero-structures

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Abstract

The present day PV industry is dominated by the solar cells and modules fabricated using c-Si. Over the last few decades, several solar cell structures have evolved from diffusion based homo-junction structures to a-Si:H based heterojunction structures (HIT cells). The advantage of HIT structure is the use of thin doped layer processed at low temperature reducing both the processing time and the feasibility of use of thinner wafer, which leads to lower overall cost and smaller energy pay-back time. To further reduce the processing time and complexities, a new approach is now being used, where the doped a-Si:H layer is replaced with the carrier selective electrodes, which form the proper heterojunctions to help photo-carrier separation and collection at appropriate site. These structures are realized using metal oxide/transition metal oxide layers along with some other layers like alkali halide. In the present talk, I shall give a brief overview of the progress in HIT cells and heterojunction solar cells with dopant free carrier selective contacts.