Title: Transport properties in microcrystalline silicon solar cells under AM1.5 illumination analysed by two-dimensional numerical simulation

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Abstract: Microcrystalline silicon is a two-phase material. Its composition can be interpreted as a series of grains of crystalline silicon imbedded in an amorphous silicon tissue, with a high concentration of dangling bonds in the transition regions. In this paper, results for the transport properties of a mu c-Si:H p-i-n junction obtained by means of two-dimensional numerical simulation are reported. The role played by the boundary regions between the crystalline grains and the amorphous matrix is taken into account and these regions are treated similar to a heterojunction interface. The device is analysed under AM1.5 illumination and the paper outlines the influence of the local electric field at the grain boundary transition regions on the internal electric configuration of the device and on the transport mechanism within the mu c-Si:H intrinsic layer. (C) 1999 Elsevier Science Ltd. All rights reserved.

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