

Title: Boron-doped nanocrystalline silicon thin films for solar cells

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Abstract: This article reports on the structural, electronic, and optical properties of boron-doped hydrogenated nanocrystalline silicon (nc-Si: H) thin films. The films were deposited by plasma-enhanced chemical vapour deposition (PECVD) at a substrate temperature of 150 degrees C. Crystalline volume fraction and dark conductivity of the films were determined as a function of trimethylboron-to-silane flow ratio. Optical constants of doped and undoped nc-Si: H were obtained from transmission and reflection spectra. By employing p(+) nc-Si: H as a window layer combined with a p' a-SiC buffer layer, a-Si: H-based p-p'-i-n solar cells on ZnO:Al-coated glass substrates were fabricated. Device characteristics were obtained from current-voltage and spectral-response measurements. (C) 2011 Elsevier B. V. All rights reserved.

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