

Abstract Submitted
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Studying the Nanostructure of Hydrogenated Nanocrystalline Silicon Thin Films K.G. KIRILUK, D.L. WILLIAMSON, P.C. TAYLOR, Colorado School of Mines, B. YAN, J. YANG, S. GUHA, United Solar Ovonic, LLC — Hydrogenated nanocrystalline silicon (nc-Si:H) is increasingly being used as the bottom layer in multi-junction solar cells. In order to better understand its growth and unique optoelectronic properties, we have used x-ray diffraction (XRD) and small angle x-ray scattering (SAXS) experiments to study its nanostructure. The XRD patterns indicate approximately 20 nm crystallites that are preferentially oriented in the (220) direction. The SAXS intensities indicate that these crystallites are elongated in the growth direction with a width of approximately three to four times less than the length. Combined, these results show ellipsoidal grains oriented in the growth direction. Transmission electron microscopy (TEM) images corroborate these results. The work performed at the Colorado School of Mines is partially supported by NSF under grant number DMR-0702351, by the NSF MRSEC program under grant number DMR-08-20518, and by DOE under subcontract number DE-FC36-07G017053. The work done at United Solar Ovonic is also partially supported by DOE under subcontract number DE-FC36-07G017053.

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