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Characterization of hydrogenation processes for c-Si photovoltaics S. KLEEKAJAI, M. STAVOLA, F. JIANG, Lehigh University — A commonly used method to introduce H into Si solar cells to passivate bulk defects is by the post-deposition annealing of an H-rich SiN_x surface layer that also acts as an antireflection coating.[1] It previously had been impossible to characterize the small concentration of H that is introduced by this method. Our work on the properties of the transition-metal-H complexes in Si has led us to develop a novel method to characterize the introduction of H into Si.[2] We have used IR spectroscopy coupled with transition-metal impurities introduced into Si-test samples to act as traps for H. The transition-metal-H complexes can then be detected with high sensitivity to determine the concentration and penetration depth of H in the samples. This model system has been used to obtain insight into what solar-cell processing strategies lead to the best passivation of defects in the Si bulk. We thank V. Yelundur and A. Rohatgi for an enjoyable and fruitful collaboration.. This work is supported by NSF Grant DMR 0403641 and NREL grant AAT-1-31605-04.

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