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Application of Raman Spectroscopy for Depth-Dependent Evaluation of the Hydrogen Concentration of Amorphous Silicon

C. Maurer[a*], S. Haas[a], W. Beyer[a], F. C. Maier[a], U. Zastrow[a], M. Hülsbeck[a], U. Breuer[b], U. Rau[a]

[a)] IEK-5 Photovoltaik, Forschungszentrum Jülich GmbH, Leo-Brandt-Straße, 52425 Jülich, Germany

[b)] ZEA-3 Analytik, Forschungszentrum Jülich GmbH, Leo-Brandt-Straße, 52425 Jülich, Germany

[*]Corresponding author: e-mail c.maurer@fz-juelich.de, Phone: +492461619748, Fax: +492461613735

Abstract

The hydrogen concentration in hydrogenated amorphous silicon (a-Si:H), produced by plasma-enhanced chemical vapor deposition, was measured by Raman and Fourier transform infrared spectroscopy before and after thermal annealing. The possibility of Raman spectroscopy to perform depth dependent analysis in adapting the analysis wavelength is used. The findings presented in this paper are supported by secondary ion mass Spectrometry depth profiles. Moreover, we show that Raman spectroscopy can be used to get depth-dependent information about the microstructure and the influence of annealing on the microstructure of a-Si:H.

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