Hans B. Normann
University of Oslo

Article

Formation of shallow front emitters for solar cells by rapid thermal processing

Hans B. Normann · Bengt G. Svensson · E.V. Monakhov

physica status solidi (c) 10/2012; 9(10-11):2138-2140. DOI: 10.1002/pssc.201200202

ABSTRACT

In this work we report on formation of shallow front emitters by phosphorus in-diffusion during rapid thermal processing (RTP). Both Filmtronics P509 diffusant and concentrated phosphoric acid were deposited on 1 Ωcm p-type mono crystalline silicon samples. Diffused shallow emitters were realized by annealing at 900 °C and 950 °C in the range of 10 – 40 s using an Annealsys AS-Micro furnace. The chemical concentration versus depth profiles of phosphorus were measured by secondary ion mass spectrometry (SIMS) and the sheet resistance was measured by four-point probing. It is found that emitters with depths in the range 100 – 275 nm and the maximum doping concentrations in the range 2 × 1020 – 1 × 1021 cm–3 can be formed after RTP.By varying the RTP-conditions, a sheet resistance of 314 – 40 Ω/sq for diffusant-treated samples and of 175 – 40 Ω/sq for phosphoric acid treated samples are obtained. The P509 diffusant and concentrated phosphoric acid gave similar emitter profiles. High solubility of phosphorus in silicon at elevated temperatures ensured a low sheet resistance even for short annealing times. It is shown that phosphorus in-diffusion during RTP is a viable method in formation of shallow front emitters for solar cells. In particular, the highest phosphorus peak concentration and the shallowest diffusion profile were achieved by in-diffusion from dehydrated phosphoric acid (© 2012 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim)

REFERENCES (8) **CITED IN** (0) Sorted by: **Order of availability**

Article: Towards high-eficiency silicon solar cells by rapid thermal processing

B. Hartiti · R. Schindler · A. Slaoui · B. Wagner · J. C. Muller · I. Reis · A. Eyer · P. Siffert

[Show abstract]

Progress in Photovoltaics Research and Applications 04/1994; 2(2):129 - 142. DOI:10.1002/pip.4670020208 · **7.58 Impact Factor**

Source

Article: Deposition and Reflow of Phosphosilicate Glass

R. A. Bowling

Journal of The Electrochemical Society 01/1985; 132(1). DOI:10.1149/1.2113749 · **3.27 Impact Factor**

Article: Dopant and carrier concentration in Si in

SIMILAR PUBLICATIONS

Direct writing the selective emitter of solar cell with lateral ultrasonic spray laser doping technique
Jingwei Song, Xuemeng Wang, Li Gong, Yanghuan Lin, Xiaodong Gao, Jiapei Huang, Hui Shen

Metabonomics study on Polygonum multiflorum induced liver toxicity in rats by GC-MS
Yuan Zhang, Nannan Wang, Meiling Zhang, Tingting Diao, Jingyue Tang, Mingzhu Dai, Suhong Chen, Guanyang Lin

c-Si solar cells formed from spin-on phosphoric acid and boric acid
Akash Yadav, Gajendra Singh, Reza Nekovei, R. Jeyakumar