## Tailoring of photoluminescence of Czochralski silicon by high temperature - pressure treatment

<sup>\*</sup>A. Misiuk,<sup>\*\*</sup>K.S. Zhuravlev, <sup>\*</sup>Z. Wiśniewski, <sup>\*\*\*</sup>T.M. Burbaev, <sup>\*\*\*</sup>V.A. Kurbatov, <sup>\*</sup>M. Prujszczyk

<sup>\*</sup>Institute of Electron Technology, Al. Lotników 46, 02-668 Warsaw, Poland <u>prujsz@ite.waw.pl</u>

\*\*Institute of Semiconductor Physics, RAS, Novosibirsk, Russia \*\*\*Physical Institute, RAS, Moscow, Russia

Dislocation related photoluminescence (PL) from silicon is promising for applications in Si based optoelectronics [1,2]. Dislocations are usually produced in Si (e. g. in oxygen containing Czochralski grown Cz-Si) by bending; the D1 dislocation-related line at 0.81 eV is typically of the highest intensity. Another way for producing dislocations is annealing of Cz-Si, especially under enhanced hydrostatic pressure (HT-HP treatment) [3]. The aim of present work is to explore potentials of the HT-HP treatment for tailoring of PL from Cz-Si.

Cz-Si with oxygen concentration of about  $1.1 \times 10^{18}$  cm<sup>-3</sup> was subjected to annealing at 1000 K under  $10^5$  Pa for 20 h (to produce oxygen clusters), and next to the HT-HP treatment at 1170 - 1620 K under HP up to above 1 GPa, for up to 5 h. PL (excited by Ar laser,  $\lambda$  = 488 nm, T=7 K) of the HT – HP treated Cz-Si is strongly dependent on the treatment parameters. The D1 line is of the highest intensity for Cz-Si treated for 5 h at 1170 - 1230 K under  $10^5$  Pa - 0.01 GPa; similar treatment results also in appearance of PL at 0.84 eV (the D5 line). The treatments at 1230 K under 1 GPa or at 1400 K under 0.01 GPa result in strong PL peaking at 0.87 eV (the D2 line).

It means that the appropriate HT-HP treatment makes it possible to tailor PL from Cz-Si. This effect results from the treatment-induced creation of oxygen-containing precipitates affecting in turn production of dislocations and of other defects in Cz-Si.

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3. A. Misiuk, B. Surma, J. Bąk-Misiuk Eur. Phys. J. Appl. Phys. 2004, 27, 301-303.