Si Nanowires FET Prepared by Ion-implantation

Sang-Kwon Lee

Department of Semiconductor Science and Technology, Chonbuk National University
664-14 Deokjin, Deokjin-Ku, Jeonju, KOREA
Tel: +82-63-270-3973, Fax: +82-63-270-3585, E-mail: sk_lee@chonbuk.ac.kr

Nanowire devices have received considerable attention for use in integrated nanoscale electronics as well as high performance sensors, owing to their one dimensional structure, high surface-to-volume ratio, and small size. In this study, current and on-going research activities of nano-sensor and device laboratory (NSDL) at Chonbuk National University were reviewed. Especially, research works on the fabrication and electrical characteristics of n- and p-channel Si nanowires FET (SiNW FET), which were prepared by both boron and phosphorus ion implantation, were reviewed. The ion implantation was performed on randomly-dispersed intrinsic Si NWs without any implantation mask under the conditions of dose of 1×10^{13} ~ 1×10^{11} ions/cm^2 and a fixed energy of 10 keV. The experimental current-voltage characteristics of the B- and P-implanted SiNW FET exhibited excellent FET behavior which corresponded well with a 2D numerical simulation. The influence of activation annealing on the electric characteristics of B-implanted Si NW FETs were also discussed. In addition, some research works were also presented on high-brightness GaN nanowire UV-blue LEDs prepared using two assembly techniques, random dispersion (RD) and dielectrophoresis assisted assembly deposition (DAAD).