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## Carbon-nanotubebased field-effect transistors with biosensing functions

Hu Yan, Hidenori Okuzaki University of Yamanashi, Japan Carbon nanotubes (CNT) (Iijima, 1991) have become attractive electronic materials to date. CNT-based field-effect transistors (FETs) have been extensively studying since applications to future electric circuits (Durkop et al., 2004; Okimoto et al., 2010) and bio-sensing chips (Li et al., 2007) were proposed. Since the CNTs have high surface-to-volume ratios high sensitivities are expected in application to biosensors. Li, et al. proposed biosensing CNT-FET for detection of prostate-specific-antigen (PSA) (Hassan et al., 2007) which is an oncological marker for the presence of prostate cancer. Herein CNT-based FETs were fabricated on strontium titanate (SrTiO3) substrate through a wet-process by using amide-functionalized CNT. The CNT-FET exhibited good gate-modulation for drain current at low operating voltages (-3 V). The hole mobility of 0.19 cm2/Vs with an on/off current ratio of 1.3. After immobilization of PSA antibody the CNT-FET clearly responded against the PSA. The drain current at -3 V of both drain and gate voltage almost linearly increased with increasing the concentration of the PSA (Yan et al., 2011).

## Biography

Upon completion of his doctorate in chemistry at The University of Tokyo in 1995 Dr. Yan joined the R&D group at Ibaraki Research Laboratory, Hitachi Chemical Industry Co. Ltd. where he carried out research works to develop sophisticated electronic components by utilizing functional polymers. After his research works on conductive polymers at Tokyo University of Science, Yamaguchi for 6 years, and on polymer gels and super water-repellent materials at Hokkaido University for 3 years, Dr. Yan joined the Laboratory of Organic Robotics at the University of Yamanashi in 2007 where he is an Associate Professor. Before his above career in Japan, Dr. Yan had been educated in China, i.e., in Jilin University (1978-1982) for Bachelor of Science on polymer chemistry and in Henan Institute of Chemistry (1984-1987) for Master of Science on inorganic chemistry. Dr. Yan has published 12 books, 76 papers, and 31 patents. Currently, Dr. Yan is also an Editorial Board Member, *Journal of Bioequivalence & Bioavailability* (OMICS Publishing Group, USA), and an Editorial Advisory Board Member, *Recent Patents on Materials Science* (Bentham Science Publishers, Ltd., USA).