

AbstractID: 1974 Title: Measurement of Ionizing Radiation Using Carbon Nanotube Field Effect Transistor

Single-walled carbon nanotube (SWNT), a class of novel nanomaterials, has shown great promise for next generation nano-electronics. Here, we present our initial effort in investigating the feasibility of using SWNT field effect transistor (SWNT-FET) for radiation dosimetry applications. Electrical measurements and Atomic Force Microscopy (AFM) images confirmed the intactness of SWNT-FET devices exposed to over 1Gy of 6MV therapeutic X-ray. The sensitivity of SWNT-FET devices was elucidated by results from real-time dose monitoring experiments and accumulated dose reading based on threshold voltage shift. SWNT-FET devices showed sensitivity at least compatible or orders of magnitude higher than commercial MOSFET dosimeter depending on device configuration. The diversity of SWNT-FET devices represents great challenge as well as potential for developing ultra sensitive and miniature (~nm) dosimeters for microbeam profiling and implantation.