This paper compares the sensitivity degradation and changes in SSD dependence of a variety of n and p type diodes under high dose radiation from electron and photon beams with different energies. Some results are controversial with the published data. Qualitative explanations are given based on the theoretical models previously presented.

For electron radiation, the sensitivity degradation follows the semi-empirical model with different energies. Under low energy 6 MV photon radiation, however, some diodes have higher sensitivity degradation than expected by considering the average Compton recoil electron energy. Under high energy 20 MV photon beam, the sensitivity degradation of a n type diode was 30%/kGy, about 6 times higher than that from a 3 MeV beam. This could be caused by the photoneutrons in 20 MV beam. Although the neutron dose is only several percent of the total dose in a 20 MV beam, the damage coefficient could be 2~3 orders higher than that of the relevant recoil electrons. This could result in several times higher radiation damage.

The change in diode SSD dependence with radiation accumulated dose does not always increase. It could also remain unchanged or even decrease, depending upon the value of the minority carrier lifetime and also due to the increase in diode resistivity with radiation dose as explained by the theoretical model in this paper. The SSD dependence of one type of detector slightly decreased after the first 10 kGy irradiation at 10 MeV electron. No significant change was found after 100 kGy.