

Amorphous selenium (a-Se), as a radiation detector, has been widely studied for applications in medical imaging due to its favorable intrinsic properties. It has been integrated in commercial systems for mammography and general radiography, and it has also been under consideration for applications in fluoroscopy and megavoltage CT (MVCT). Recently, a-Se evaporated on active matrix flat panel imager (AMFPI) comprised of thin film transistors (TFTs) has been developed, which can generate images with excellent resolution suitable for medical imaging. However, these detectors suffer from temporal artifacts, resulting in latent ghost images, characterized by reduced contrast in subsequent acquired images. To understand the effects of detector parameters on the reduction of sensitivity in a-Se AMFPIs, we studied individual biased a-Se photoconductors as radiation detectors. The sensitivity variation as a function of radiation air-kerma delivered to the detector was measured for various operating conditions of a-Se AMFPIs: different applied electric field strengths, x-ray air-kerma rates, and effective photon energies. We compared the reduction of x-ray sensitivity effect measured in two different modes, for a biased and unbiased detector during irradiation time intervals. We also studied the rate of sensitivity recovery after unbiased detector was irradiated to different air-kerma values. The presented work was performed to compare the sensitivity reduction measured in two different modes: biased and un-biased detector during irradiation. This data will aid in developing the kinetic models of signal formation, charge trapping and eventually the sensitivity reduction in a-Se detectors.