AbstractID: 14167 Title: Resistive Interface Layer for Flat-panel Imager (FPI) with Avalanche Gain

Resistive Interface Layer for Avalanche a-Se Photodetector

Purpose: The low dose performance of existing solid-state flat panel imagers (FPI) are degraded by electronic noise. To overcome this problem, we have proposed a new FPI concept. It employs a structured CsI scintillator to convert incident x-rays to optical photons, which is converted to amplified electronic signal by a thin (~15 microns) amorphous selenium (a-Se) photoconductor with avalanche multiplication gain. One critical component of this detector is the resistive interface layer (RIL) which provides protection of electrical breakdown under high electric field (>100V/um) required for avalanche multiplication. **Method and Material:** Using physics model and simulation, we estimated the desirable range of resistivity and thickness of RIL to a while maintaining good spatial resolution and image lag. Material deposition procedures were developed to achieve these RIL properties. **Results:** Our investigation found that RIL with resistivity in the range of 10^10 to 10^12 ohm-cm and with thickness of 2 microns (with solution based deposition methods) could provide satisfactory imaging performance. RIL material based on mixing insulating polymers with conductive fillers provides great versatility for our purpose.