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Direct X-ray detection with hybrid solar cells based on organolead halide perovskites HARDEEP SINGH GILL, BASSEM ELSHAHAT, ERNO SAJO, JAYANT KUMAR, Department of Physics and Applied Physics, University of Massachusetts Lowell, Lowell, MA 01854, AKSHAY KOKIL, Center for Advanced Materials, University of Massachusetts Lowell, Lowell, MA 01854, PIOTR ZYGMANSKI, Department of Radiation Oncology, Brigham and Women's Hospital & Dana Faber Cancer Institute, Harvard Medical School, Boston, MA 02115, USA, LIAN LI, RAVI MOSURKAL, US Army Natick Soldier Research, Development & Engineering Center, Natick, MA 01760 — Organolead halide perovskite materials are attracting considerable interest due to their exceptional optoelectronic properties, such as, high charge carrier mobilities, high exciton diffusion length, high extinction coefficients and broad-band absorption. These interesting properties have enabled their application in high performance hybrid photovoltaic devices. The high Z value of their constituents also makes these materials efficient for absorbing X-rays. Here we will present on the efficient use of hybrid solar cells based on organolead perovskite materials as X-ray detectors. Hybrid solar cells based on $CH_3NH_3PbI_3$ were fabricated using facile processing techniques on patterned indium tin oxide coated glass substrates. The solar cells typically had a planar configuration of ITO/$CH_3NH_3PbI_3$/P3HT/Ag. High sensitivity for X-rays due to high Z value, larger carrier mobility and better charge collection was observed. Detecting X-rays with energies relevant to medical oncology applications opens up the potential for diagnostic imaging applications.

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