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Record stability for fully passive perovskite-based X-ray detectors through the use of a polymeric template

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High sensitivity and efficient X-ray detectors are needed to promote and boost their application as tools in medical diagnostics and radiotherapy. Lead halide perovskites have emerged recently as a novel class of material for efficient X-ray detection. Although 3D perovskites possess very interesting optoelectronic properties they suffer from low environmental and operational stability. Here we report a strategy based on using starch as a polymeric template for the fabrication of stable thin film perovskite X-ray detectors. The proposed p-i-n photodiodes can operate with no external bias applied (fully passive devices), reaching a top sensitivity of 5.5±0.2 μC Gy-1 s-1. The device degradation was monitored for sample stored in air for a time window of 630 days, demonstrating an exceptional stability: 97% of the initial sensitivity was retained for the best perovskite-starch composite formulation making it the most stable unencapsulated perovskite X-ray detector reported so far.

Ref: Verdi et al, Advanced Materials Interfaces, 2023, doi 10.1002/admi.202300044

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