Supporting Information: Flexible Inkjet-Printed Triple Cation Perovskite X-ray Detectors

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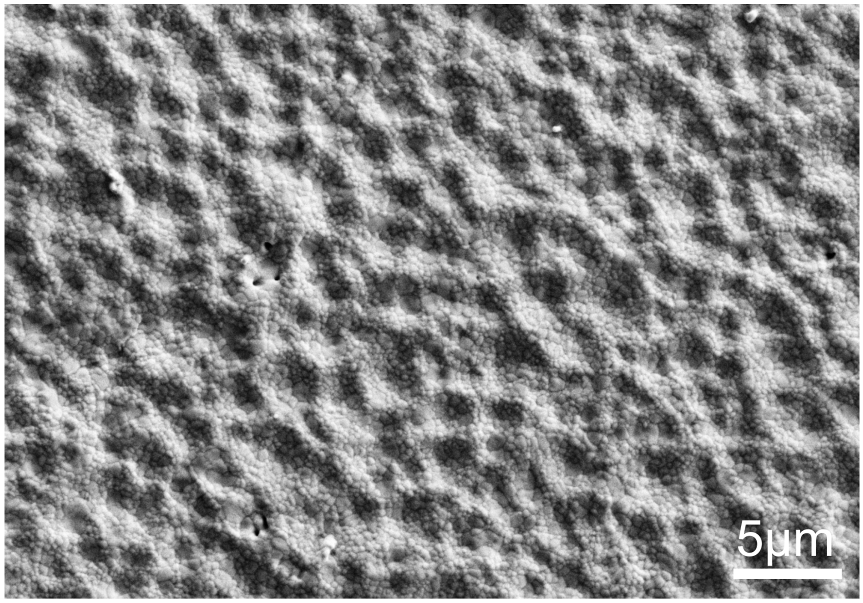

Figure S1: Scanning electron microscopy image (top view) of an inkjet-printed triple cation perovskite (TCP) layer covered with a thin layer composed of C_{60} fullerene and bathocuproine (BCP).

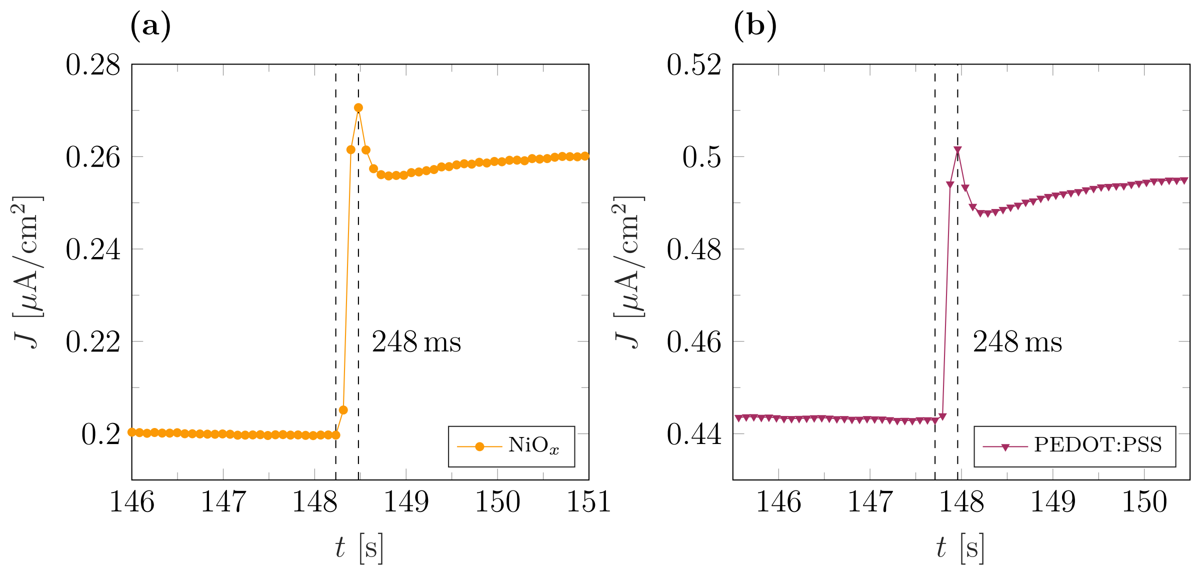

Figure S2: Zoomed sections of the time-resolved current response shown in Fig. 3(a). The rising current responses during the first X-ray pulse with the lowest dose rate are shown separately for the detector based on a NiO_x (a) and a poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS) (b) hole transport layer. The rise times are estimated by the time to reach the maximum signal.

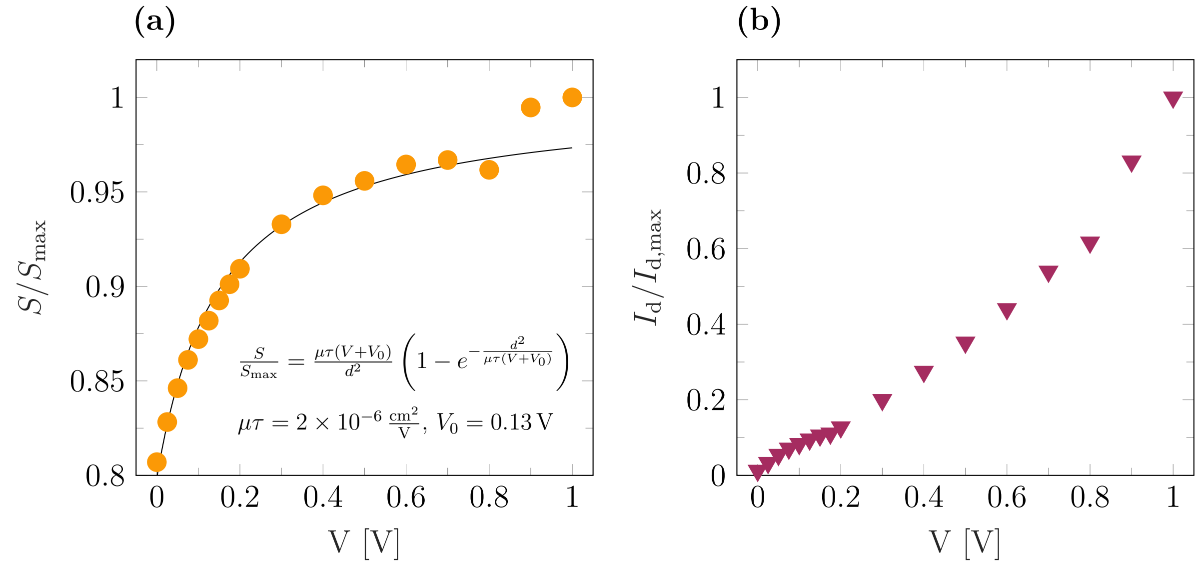

Figure S3: (a) Normalized X-ray sensitivity and (b) normalized dark current of a rigid NiO_x based triple cation perovskite X-ray detector operated at different reverse biases. The X-ray sensitivity is characterized under 70 kVp X-rays with increasing dose rates in the range of $1.4-6.3\,\mathrm{mGy_{air}/s}$. The mobility-lifetime product $\mu\tau$ is estimated by fitting a modified single carrier Hecht equation in (a).

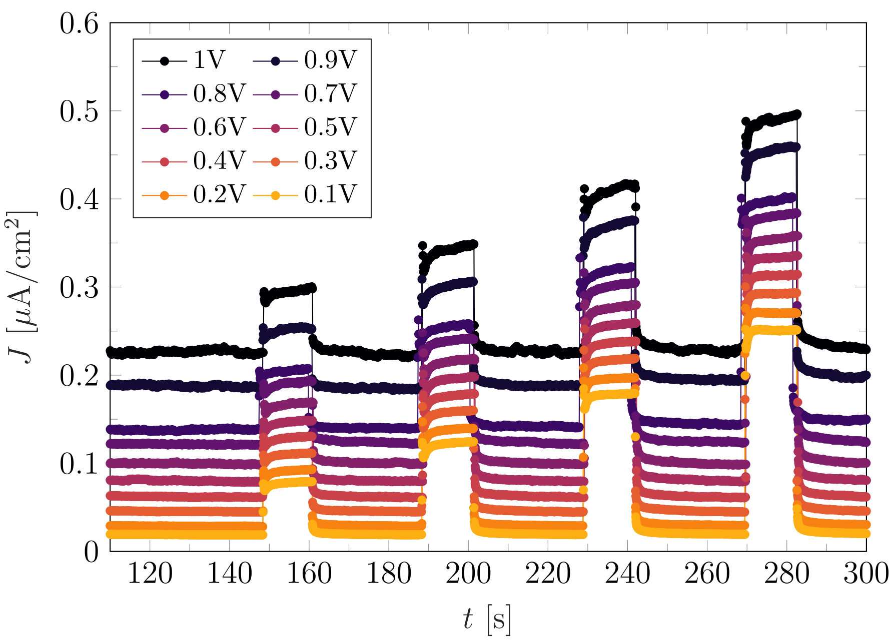

Figure S4: Time-resolved current response of a rigid NiO_x based triple cation perovskite X-ray detector operated at different reverse biases to 70 kVp X-rays with increasing dose rates in the range of $1.4-6.3\,\mathrm{mGy_{air}/s}$.

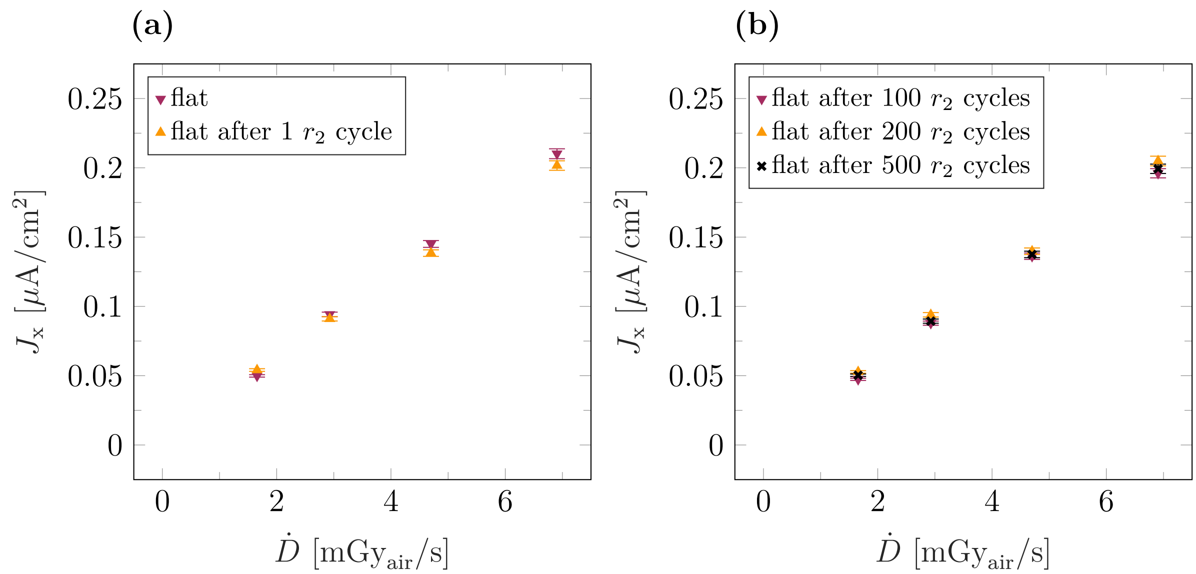

Figure S5: Dark current corrected X-ray induced current density of a flexible NiO_x based triple cation perovskite X-ray detector as a function of the applied dose rate (a) before and after 1 bending cycle to $r_2 \approx 6\,$mm and (b) after 100, 200, and 500 bending cycles to r_2. The detector is operated at a reverse bias of 0.1 V (0.027 V/μm) and is characterized under 70 kVp X-rays with increasing dose rates in the range of $1.7 - 6.9\,\mathrm{mGy_{air}/s}$. The error bars are estimated from variations in the X-ray induced current, the dark current, and the active area.