# Photovoltaic stimulation of mouse and pig retina with pyrolytic carbon microelectrodes integrated on high-density silicon solar cell arrays

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# Supplementary information

**Photovoltaic test pixel with Au contacts.**

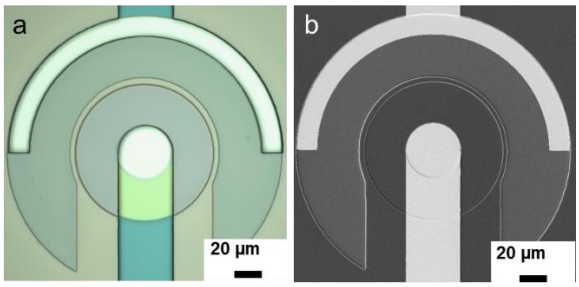


**Fig. S1**: a) Optical microscope and b) SEM image of single photovoltaic pixel with a diameter of 200 µm with Au contacts on central $n^+$ region and annular $p^+$ region.

**Photovoltaic pixel characterization with visible light.** Initially, the photovoltaic properties of the pixels were characterized in a solar simulator for conventional testing of solar cells with visible light in AM 1.5G spectral conditions (100 mW $cm^{-2}$). Fig. S2 shows a schematic of the experimental setup.

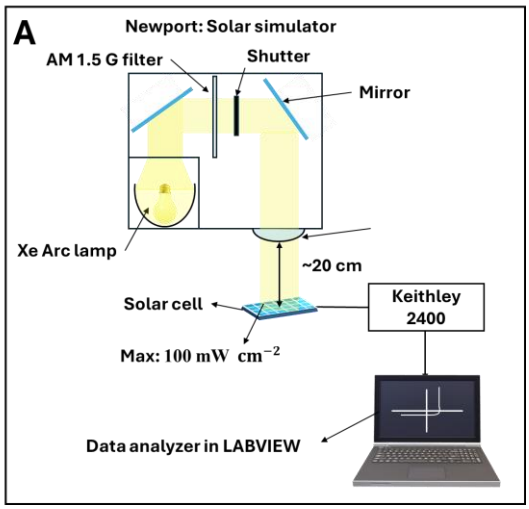


**Fig. S2:** Setup for testing solar cell pixels with AM 1.5G spectral conditions.

**Photovoltaic pixel characterization with NIR illumination.**

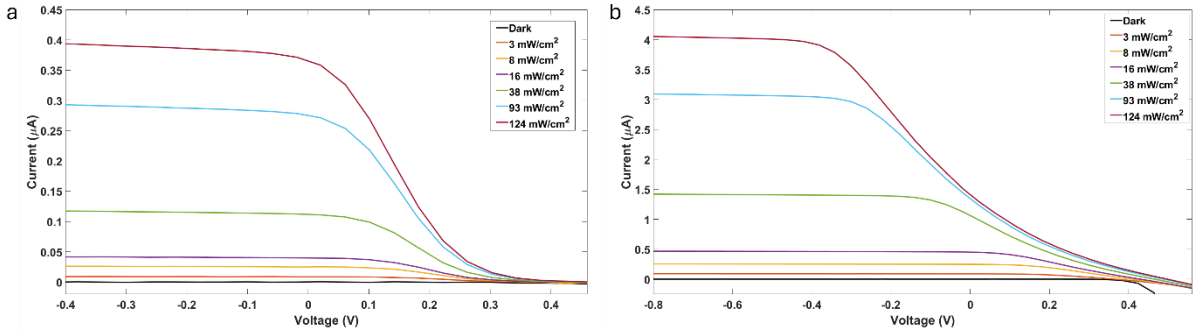


**Fig. S3**: I-V curves recorded for single photovoltaic pixels with diameter of a) 40 µm and b) 200 µm with Au contacts under 940 nm illumination with different intensities.

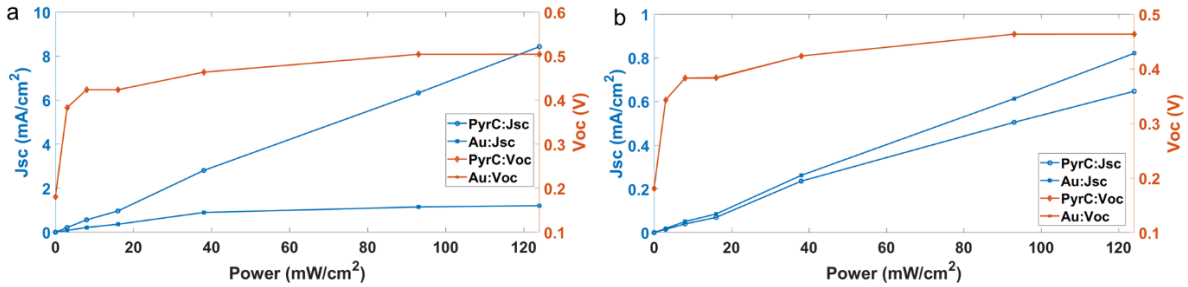


**Fig. S4**: Comparison of short circuit current density $J_{sc}$ and open circuit voltage $V_{oc}$ for a) 40 µm pixels and b) 200 µm pixels under 940 nm illumination with different intensities.

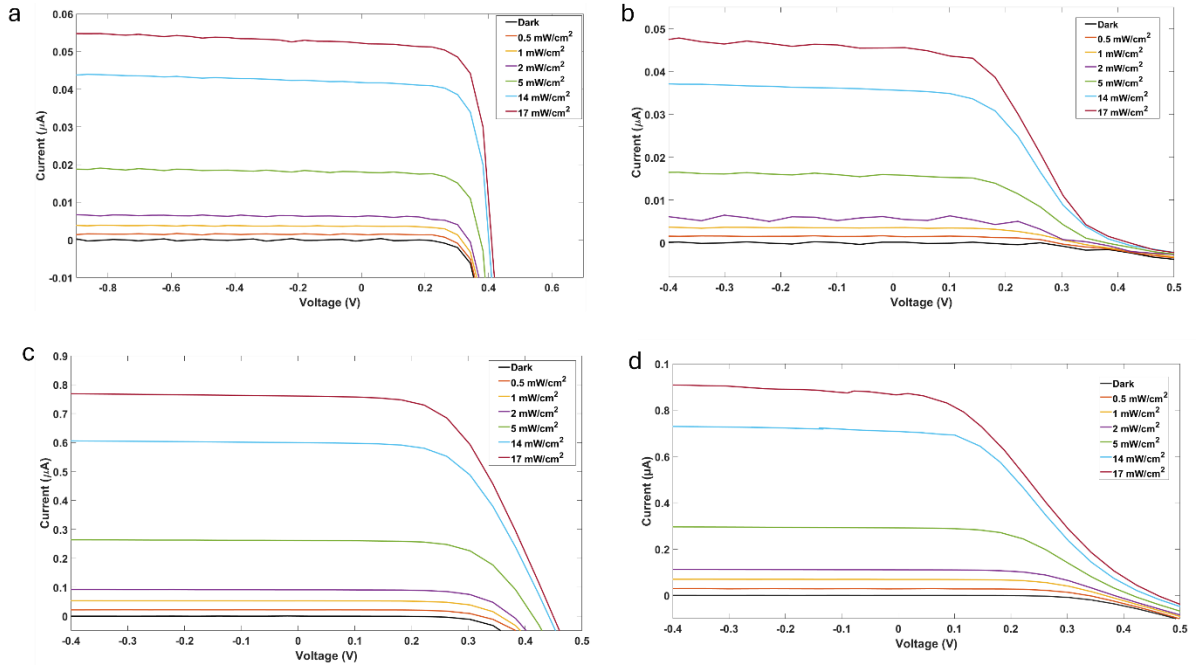


**Fig. S5:** I-V curves recorded for single photovoltaics pixels with diameter of a-b) 40 µm and c-d) 200 µm with a) and c) PyrC contacts and b) and d) Au contacts under 880 nm illumination with different intensities.

**Table S1**. Fill factor FF, short circuit current $I_{sc}$ and open circuit voltage $V_{oc}$ extracted from the recorded I-V curves under 880 nm NIR illumination at different intensities for pixels with PyrC and Au electrodes.

| Irradiance 880 nm ($mW\ cm^{-2}$) | 40 µm pixels | | | | | | 200 µm pixels | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FF | | $I_{sc}$ (nA) | | $V_{oc}$ (V) | | FF | | $I_{sc}$ (µA) | | $V_{oc}$ (V) | |
| | Au | PyrC | Au | PyrC | Au | PyrC | Au | PyrC | Au | PyrC | Au | PyrC |
| 0.5 | 0.51 | 0.76 | 1 | 1 | 0.295 | 0.262 | 0.61 | 0.69 | 0.03 | 0.02 | 0.332 | 0.362 |
| 1 | 0.38 | 0.68 | 3 | 3 | 0.336 | 0.302 | 0.55 | 0.68 | 0.06 | 0.05 | 0.382 | 0.383 |
| 2 | 0.38 | 0.64 | 5 | 6 | 0.342 | 0.343 | 0.54 | 0.65 | 0.11 | 0.09 | 0.382 | 0.392 |
| 5 | 0.30 | 0.65 | 15 | 17 | 0.382 | 0.382 | 0.43 | 0.61 | 0.29 | 0.26 | 0.423 | 0.410 |
| 14 | 0.27 | 0.72 | 33 | 41 | 0.416 | 0.410 | 0.31 | 0.58 | 0.72 | 0.59 | 0.467 | 0.455 |
| 17 | 0.22 | 0.68 | 45 | 52 | 0.423 | 0.423 | 0.29 | 0.51 | 0.87 | 0.76 | 0.495 | 0.463 |