

Supporting information

Optically triggered infrared photodetector

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Figure 5 shows the dependency of the OTIP infrared response at $T = 9$ K, for a light bias current (LBC) of 40 mA, as a function of the OTIP voltage bias V_{bias} . Under $V_{\text{bias}} = 1$ V (dotted line), the response is reduced roughly to 60% of the value at short-circuit (dashed line). Under $V_{\text{bias}} = -1$ V (solid line), the response increases slightly. For comparison, the measurement at $V_{\text{bias}} = 0$ V (short-circuit) for a LBC of 60 mA is also plotted (open circles). Interestingly, the latter agrees with the measurement at $V_{\text{bias}} = -1$ V for the 40 mA LBC case. This result shows that a negative voltage bias increases the responsivity of the OTIP by improving the collection efficiency of the photo-generated carriers. The results showing the dependence of ΔJ_{SC} with the increased LED illumination intensity (Figure 3c) indicated the saturation of the IR photo-detection at the highest illumination intensities used. The fact that the photo-detection at LBC = 40 mA and OTIP $V_{\text{bias}} = -1$ V matches the one corresponding to the LBC of 60 mA and OTIP $V_{\text{bias}} = 0$ V supports this hypothesis.

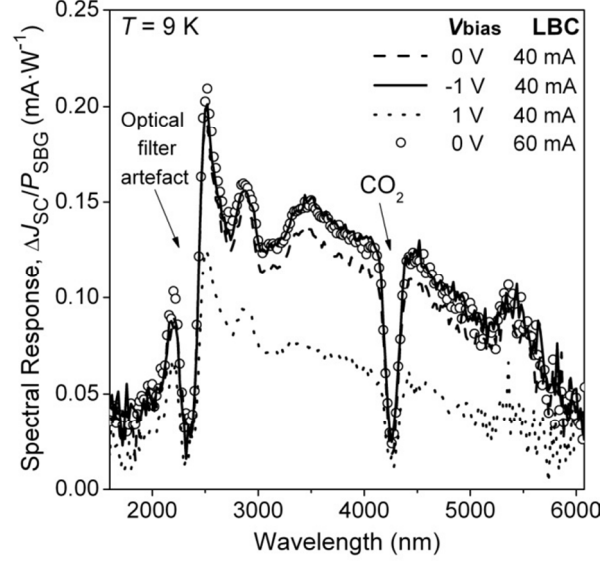


Figure 5. The spectral response of the OTIP for several biasing voltages (V_{bias}) and a LED light intensity corresponding to a LBC of 40 mA. The dashed, solid and dotted lines represent the measurements at V_{bias} equal to 0, -1 and 1 V, respectively. For comparison, the measurement at $V_{\text{bias}} = 0$ V for an LBC of 60 mA is also plotted (open circles).

Figure 6 plots the spectral response of the OTIP measured at $T = 60$ K. In this case, no measureable signal was detected when the LED was OFF. However, the IR detection was recovered when the LED is switched ON, as shown for the 40 mA LBC case, demonstrating proper OTIP operation.

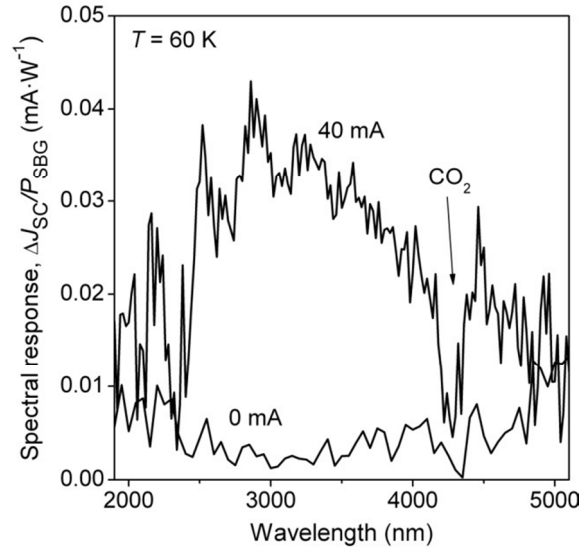


Figure 6. The spectral response of the OTIP at $T = 60$ K for LBCs of 0 and 40 mA.