

Some Design Considerations on the Electrode Layout of ZnO Pyroelectric Sensors

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In this study, we investigate the effect of top-electrode layout on the responsivity, which is defined as the ratio of the output voltage from the sensor to the incident radiation power, of ZnO pyroelectric sensors. Four different top-electrode layouts, namely, those of the crisscross, target, web, and full-cover types, are used to demonstrate the design concept. On the basis of the experiment, the responsivity of the sensor may be improved by opening the windows so that the ZnO layer can directly come into contact with the heat source. However, the contact windows may reduce the top-electrode area and disperse the electrode. The electrode area reduction and dispersion may degrade the responsivity of the sensor. Thus, in the layout design of the top electrode, both the contact window size of the ZnO layer and the dispersion of the top electrodes must be considered. In this study, we designed a web-type top electrode. The outer regions of this electrode possess large contact windows of the ZnO layer, whereas the inner regions possess dense top electrodes. The experiment results showed better responsivity of the sensor with the proposed web-type top electrode. The responsivity of the web type is about 4 times that of the full-cover type.

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