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**Photo-induced pyroelectric spikes for neuromorphic sensors**Mohit Kumar<sup>a,b</sup>, Dong-Kyun Ban<sup>a,b</sup>, and Joondong Kim<sup>a,b,\*</sup>

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**Abstract**

The present report shows the photo-induced spike generation from the transparent ITO/V<sub>2</sub>O<sub>5</sub>/ZnO/ITO device. Particularly, pyroelectric ZnO and hole selective V<sub>2</sub>O<sub>5</sub> are utilized to construct the all oxide-based self-biased and transparent ultra-violet spike generator. It is demonstrated that the magnitude of the spikes depends on the incoming photon intensity. The spike generation from all-oxide-based transparent device will be useful to design advanced see-through neuromorphic devices beyond the energy generation entities. In addition, external electric potential-dependent tunability of the spike generation is presented for high-efficient performances. This self-biased, transparent photodetector could be a replacement of the silicon neurons and resolve the issue of power consumption.

**Keywords:** Photo-induced spike; Neuromorphic sensors; Self-biased; Transparent generator; High-efficient performances.

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