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(54) **Title**: A METHOD AND APPARATUS FOR DETECTING INFRARED RADIATION WITH GAIN

(57) **Abstract**: Photodetectors, methods of fabricating the same, and methods using the same to detect radiation are described. A photodetector can include a first electrode, a light sensitizing layer, an electron blocking/tunneling layer, and a second electrode. Infrared-to-visible upconversion devices, methods of fabricating the same, and methods using the same to detect radiation are also described. An Infrared-to-visible upconversion device can include a photodetector and an OLED coupled to the photodetector.

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