CLAIMS

1. An electromagnetic radiation detector comprising a glass inlet window (310) having an upstream face (311) intended to receive a flux of incident photons as well as a downstream face (312) opposite to the upstream face, a photocathode in the form of a semiconductor layer (320), intended to generate photoelectrons from the incident photons and to emit said photoelectrons thus generated, an electron multiplier device (330) configured to receive the photoelectrons emitted by the photocathode and to generate for each received photoelectron a plurality of secondary electrons and an output device (340) configured to generate an output signal from said secondary electrons, characterised in that a transparent conductive layer (316) is deposited over the downstream face (312) of the inlet window and that a thin insulating layer (317) is disposed between said conductive layer (316) and the semiconductor layer (320), the conductive layer being electrically connected to a first electrode (315) and the semiconductor layer being electrically connected to a second electrode (325), a negative voltage being applied between the first electrode and the second electrode so that the conductive layer (316) is always set at a potential lower than that of the photocathode in the form of a semiconductor layer (320).

2. The electromagnetic radiation detector according to claim 1, characterised in that the semiconductor layer is made of a polycrystalline semiconductor material.

3. The electromagnetic radiation detector according to claim 2, characterised in that the polycrystalline semiconductor material is selected from SbK_2Cs, $SbRb_2Cs$, $SbRb_2Cs$, $SbCs_3$, $SbNa_3$, SbNaKRbCs, SbNaKCs, $SbNa_2KCs$.

4. The electromagnetic radiation detector according to claim 1, characterised in that the semiconductor layer is made of a III-IV or II-VI monocrystalline semiconductor material.

5. The electromagnetic radiation detector according to one of the preceding claims, characterised in that the transparent conductive layer is made of ITO or ZnO.

6. The electromagnetic radiation detector according to one of the preceding claims, characterised in that the thin insulating layer is made of a dielectric material having a breakdown voltage higher than 1 V/ 10 nm.

7. The electromagnetic radiation detector according to claim 6, characterised in that the thin insulating layer has a thickness of 100 to 200 nm.

8. The electromagnetic radiation detector according to claim 6 or 7, characterised in that the dielectric material is selected from Al_2O_3, SiO_2, HfO_3.

9. The electromagnetic radiation detector according to one of the preceding claims, characterised in that the potential difference applied between the second electrode and the first electrode is selected higher than or equal to $\frac{4\delta\sqrt{\varepsilon_s \Delta U_{bb} e N_a}}{\varepsilon_d}$

where ε_s and ε_d are respectively the dielectric constants of the semiconductor layer and of the insulating layer, δ is the thickness of the insulating layer, ΔU_{bb} is the amplitude of the band bending in the absence of any applied potential difference, N_a is the concentration of acceptors in the semiconductor layer and e is the charge of the electron.