**CLAIMS**

1. A self-powered photodetector, comprising:

a photovoltaic sensor element for generating an electrical charge under exposure to electromagnetic radiation;

a charge storage section for accumulating the electrical charge generated by the photovoltaic sensor element;

an electrical load configured to be powered by the accumulated electrical charge from the charge storage section and outputs a signal in response thereto, the signal ~~being analyzable~~configured to be analyzed to determine a measurement of the electromagnetic radiation; and

a switch for controlling a flow of the accumulated electrical charge from the charge storage section to the electrical load for powering the electrical load.

2. The self-powered photodetector according to claim 1, wherein the photovoltaic sensor element comprises a polar dielectric material.

3. A self-powered photodetector, the photodetector being a UV detector comprising:

a photovoltaic sensor element comprising a polar dielectric material for generating an electrical charge under exposure to electromagnetic radiation, wherein the electromagnetic radiation is UV radiation;

a charge storage section for accumulating the electrical charge generated by the photovoltaic sensor element;

an electrical load configured to be powered by the accumulated electrical charge from the charge storage section and outputs a signal in response thereto, the signal configured to be analyzed to determine a measurement of the electromagnetic radiation; and

a switch for controlling a flow of the accumulated electrical charge from the charge storage section to the electrical load for powering the electrical load.

~~2~~4. The self-powered photodetector according to any preceding claim ~~1~~, wherein the measurement of the electromagnetic radiation is determined based

on a duration of the signal output by the electrical load when enabled by the switch to be powered by the accumulated electrical charge.

35. The self-powered photodetector according to claim 24, wherein the measurement comprises a dosage of the electromagnetic radiation, and the dosage is determined based on a correlation with the duration of the signal.

46. The self-powered photodetector according to any one of claims 1 to 35, wherein the switch comprises a mechanical switch configured to form an electrical connection between the charge storage section and the electrical load when actuated by an external force, the electrical connection enabling the accumulated electrical charge to power the electrical load.

57. The self-powered photodetector according to any one of claims 1 to 3, wherein the signal comprises a first signal output by the electrical load when powered by the accumulated electrical charge at a first time and a second signal output by the electrical load when powered by the accumulated electrical charge at a second time subsequent to the first time, and the measurement of the electromagnetic radiation is determined based on a time interval between the first signal and the second signal.

68. The self-powered photodetector according to claim 57, wherein the measurement comprises an intensity of the electromagnetic radiation, and the intensity is determined based on a correlation with the time interval between the first signal and the second signal.

79. The self-powered photodetector according to any one of claims 1-35, 5-7 and 68, wherein the switch comprises an autonomous switch configured to form an electrical connection between the charge storage section and the electrical load when the electrical charge in the charge storage section reaches a predetermined level, the electrical connection enabling the accumulated electrical charge to power the electrical load.

810. The self-powered photodetector according to claim 79, wherein the autonomous switch comprises a cantilever-type device configured to be

actuated by the accumulated electrical charge in the charge storage section for forming the electrical connection.

~~9~~11. The self-powered photodetector according to claim ~~8~~10, wherein the cantilever-type device comprises a piezoelectric thin-strip material configured to bend towards a contact point of the electrical load as the electrical charge in the charge storage section builds up towards the predetermined level and be in contact therewith to form the electrical connection when the electrical charge in the charge storage section reaches the predetermined level.

~~10~~12. The self-powered photodetector according to claim ~~7~~9, wherein the autonomous switch comprises a transistor-based circuit configured to be turned on when the electrical charge in the charge storage section reaches the predetermined level to form the electrical connection for enabling the accumulated electrical charge to power the electrical load.

~~11~~13. The self-powered photodetector according to claim ~~10~~12, wherein the transistor-based circuit has a gate terminal connected to the charge storage section via a voltage divider comprising a plurality of resistors and/or capacitors.

~~12~~14. The self-powered photodetector according to any one of claims 1 to ~~11~~13, wherein the charge storage section comprises the photovoltaic sensor element operable to accumulate the electrical charge generated.

~~13~~15. The self-powered photodetector according to claim ~~12~~14, wherein the photovoltaic sensor element has a high electrical impedance for facilitating the accumulation of the electrical charge generated.

~~14~~16. The self-powered photodetector according to claim ~~12~~14, wherein the photovoltaic sensor element is configured to generate the electrical charge under exposure to electromagnetic radiation without being limited by an interfacial energy barrier for facilitating charge accumulation.

~~15~~17. The self-powered photodetector according to any one of claims ~~12~~ 14 to ~~14~~16, wherein the charge storage section further comprises one or more capacitors connected in parallel with the photovoltaic sensor element for accumulating the electrical charge generated.

~~16~~18. The self-powered photodetector according to claim ~~15~~17, wherein the one or more capacitors are low leakage current capacitors.

~~17. The self-powered photodetector according to any one of claims 1 to 16, wherein the photovoltaic sensor element comprises a polar dielectric material.~~

~~18~~19. The self-powered photodetector according to claim ~~17~~2 or 3, wherein the polar dielectric material comprises a ferroelectric material.

~~19~~20. The self-powered photodetector according to claim 2, 3 or ~~17 or 18~~19, wherein the photovoltaic sensor element comprises: a substrate, a thin film made of the polar dielectric material formed on the substrate, and a pair of interdigital electrodes formed on the thin film for generating the electrical charge based on a photovoltage obtained between two terminals of the pair of interdigital electrodes under exposure to electromagnetic radiation.

~~20~~21. The self-powered photodetector according to any preceding ~~one of~~ claim~~s 1 to 19~~, wherein the electrical load comprises either:

a wireless transmitter module for outputting said signal when powered by the accumulated electrical charge; or.

~~21~~20. ~~The self-powered photodetector UV detector according to any one of claims 1 to 19~~18, ~~wherein the electrical load comprises~~ a light emitting diode configured to emit light when powered by the accumulated electrical charge; and said signal being in the form of the light emitted.

22. A self-powered photodetector according to claim 1, wherein the electromagnetic radiation is UV radiation.

~~22~~23. A wireless receiver for receiving and analysing a signal to output a measurement of an electromagnetic radiation, the wireless receiver comprising:

a wireless receiver module operable to receive the signal from the self-powered photodetector according to any one of claims 1 to ~~21~~22;

a processor unit operable to analyze the signal and output the measurement of the electromagnetic radiation;

a computer-readable storage medium for storing executable instructions, and when executed by the processor unit causes the processor unit to analyse the signal and output the measurement of the electromagnetic radiation; and

a display for displaying the measurement of the electromagnetic radiation computed by the processor unit.

~~23~~24. A photodetector system comprising:

a self-powered photodetector according to any one of claims 1 to ~~21~~ 22 for sensing electromagnetic radiation and outputting a signal analyzable to determine a measurement of the electromagnetic radiation; and

a wireless receiver according to claim ~~22~~ 23 for receiving and analysing the signal to output the measurement of the electromagnetic radiation.

~~24~~25. A method of fabricating a self-powered photodetector, the method comprising:

providing a photovoltaic sensor element for generating an electrical charge under exposure to electromagnetic radiation;

providing a charge storage section for accumulating the electrical charge generated by the photovoltaic sensor element;

providing an electrical load configured to be powered by the accumulated electrical charge from the charge storage section and outputs a signal in response thereto, the signal ~~being analyzable~~configured to be analyzed to determine a measurement of the electromagnetic radiation; and

providing a switch for controlling a flow of the accumulated electrical charge from the charge storage section to the electrical load for powering the electrical load.