CLAIMS

1. A rechargeable accumulator comprising one or more metal-air cells, each cell comprising

- a first terminal ~~(1)~~ and a second terminal ~~(2)~~,
- a metal negative electrode ~~(3)~~ for a metal-air cell, connected to the first terminal ~~(1)~~,
- a first positive oxygen-releasing electrode ~~(4)~~,
- a second positive electrode ~~(5)~~, which is a porous air electrode containing at least one oxygen reducing catalyst, and
- an electrolyte,

characterized in that it furthermore comprises

- control means ~~(6)~~ adapted to continuously compare the measured voltage ~~(V_m)~~ between the second terminal ~~(2)~~ and the first terminal ~~(1)~~ to a setpoint value ~~(V_o)~~ and to send a switch signal to switching means ~~(7)~~ when the measured voltage ~~(V_m)~~ falls below the setpoint value ~~(V_o)~~,
- the switching means ~~(7)~~ adapted to receive a switch signal originating from the control means ~~(6)~~ and to connect and disconnect the air electrode ~~(5)~~ from the second terminal ~~(2)~~.

2. The accumulator of claim 1, characterized in that the negative electrode ~~(3)~~ is a lithium electrode ~~(Li/LiOH)~~ or a zinc electrode ~~($Zn/Zn(OH)_4^{2-}$)~~.

3. The accumulator of claim 1 or claim 2, characterized in that the first positive oxygen-releasing electrode ~~(4)~~ is a silver electrode ~~(Ag/AgO)~~ or a nickel electrode ~~(Ni/NiO or NiOH/NiOOH)~~.

4. The accumulator as claimed in any one of the preceding claims, characterized in that the air electrode comprises carbon particles and on at least one oxygen reducing catalyst.

5. The accumulator as claimed in any one of the preceding claims, characterized in that the oxygen reducing catalyst in the air electrode is chosen from the group formed by manganese oxide and cobalt oxide.

6. The accumulator as claimed in any one of the preceding claims, characterized in that the setpoint value ~~(V_o)~~ is set to a value lower than the open

circuit voltage of the cell in the charged state when only the air electrode is connected.

7. The accumulator as claimed in any one of the preceding claims, characterized in that the control means ~~(6)~~ is an electromechanical relay driven by an operational amplifier.

8. The accumulator as claimed in any one of the preceding claims, characterized in that the first positive electrode ~~(4)~~ takes the form of a grid or of a perforated plate and lies between the negative electrode and the air electrode.

9. A method for storing and releasing electrical energy using an accumulator as claimed in any one of the preceding claims, said method comprising the following successive steps:

(a) a charging phase during which the negative electrode ~~(3)~~ is connected to the first terminal ~~(1)~~, the first positive electrode ~~(4)~~ is connected to the second terminal ~~(2)~~ and the air electrode ~~(5)~~ is disconnected,

(b) a first discharging phase during which the negative electrode ~~(3)~~ is connected to the first terminal ~~(1)~~, the first positive electrode ~~(4)~~ is connected to the second terminal ~~(2)~~, the air electrode ~~(5)~~ is disconnected, and the control means ~~(6)~~ continuously compare the measured voltage ~~(V_m)~~ between the second terminal ~~(2)~~ and the first terminal ~~(1)~~ to a setpoint value ~~(V_c)~~,

(c) a first switching step during which the second positive electrode ~~(5)~~, which is the air electrode, is connected to the second terminal ~~(2)~~ when the value of the voltage between the terminal ~~(2)~~ and the terminal ~~(1)~~ falls below the setpoint value ~~(V_c)~~,

(d) a second discharging phase during which the negative electrode ~~(3)~~ is connected to the first terminal ~~(1)~~, and the air electrode ~~(5)~~ is connected to the second terminal ~~(2)~~, and

(e) a second switching step during which the air electrode ~~(5)~~ is disconnected from the second terminal ~~(2)~~.

10. The method as claimed in claim 9, characterized in that in the first switching step, the switching means ~~(7)~~ disconnect the first positive electrode ~~(4)~~ from the second terminal ~~(2)~~.

11. The method as claimed in claim 9, characterized in that in the first switching step, ~~the~~ the switching means ~~(7)~~ do not disconnect the first positive electrode ~~(4)~~ from the second terminal ~~(2)~~.