

We Claim:

1. ~~In an improved rechargeable lithium battery, said~~
rechargeable lithium battery having a positive electrode
containing a transition metal compound capable of
5 incorporating lithium ions in its structure as the positive
active material, a negative electrode containing carbonaceous
particles capable of intercalating lithium ions as the
negative active material, a non-aqueous electrolyte conductive
of lithium ions, and a total amount of lithium ions
10 distributed between the electrodes and the non-aqueous lithium
ion bearing electrolyte, said rechargeable lithium battery
having a capacity measured in milliampere-hours per gram
weight of battery (mAh/g.), an anode specific reversible
capacity (mAh/g.) and a cathode specific reversible capacity
15 (mAh/g.), the improvement comprising that the weight of the
negative active material in said negative electrode (w_a) and
the weight of the positive active material in the positive
electrode (w_c) are adjusted such that the ratio of said anode
specific reversible capacity multiplied by said weight of the
20 negative active material contained in said rechargeable
lithium battery to said cathode specific reversible capacity
multiplied by said weight of the positive active material
contained in said rechargeable lithium ion battery:

$$\text{mAh/g.} \times w_a : \text{mAh/g.} \times w_c = 0.85 - 1.15;$$
 thereby providing a
25 rechargeable lithium battery having an energy density of at
least 320 watt.hour/liter.

2. A rechargeable lithium battery as claimed in claim 1,
wherein said rechargeable lithium battery is a planar battery
having energy density at least 130 watt.hour/kg.

30 3. A rechargeable lithium battery as claimed in claim 1,
wherein a portion of said total amount of lithium ions in said
rechargeable lithium battery has been introduced in said
carbonaceous particles capable of intercalating lithium ions
subsequent to assembling said positive electrode, said
35 ~~negative electrode and said non-aqueous electrolyte conductive~~

~~of lithium ions comprised in said rechargeable lithium battery, but prior to packaging and sealing said rechargeable lithium battery.~~

4. A rechargeable lithium battery as claimed in claim 3,
5 wherein said portion of said total amount of lithium ions has been introduced in said carbonaceous particles by electrolytic means utilizing a third electrode comprising one of the group consisting of elemental lithium, a lithium alloy and a lithium containing compound.
- 10 5. A rechargeable lithium battery as claimed in claim 1, wherein the transition metal compound capable of incorporating lithium ions in its structure is a transition metal chalcogenide.
- 15 6. A rechargeable lithium battery as claimed in claim 5, wherein the transition metal chalcogenide capable of incorporating lithium ions in its structure is selected from the group consisting of: manganese oxide, cobalt oxide, nickel oxide, vanadium oxide, chromium oxide, copper oxide, tungsten oxide and oxides of alloys thereof, titanium sulphide and iron
20 sulphide.
7. A rechargeable lithium battery as claimed in claim 1, wherein the non-aqueous electrolyte conductive of lithium ions is a lithium ion containing solid polymer electrolyte.
- 25 8. A rechargeable lithium battery as claimed in claim 1, wherein the non-aqueous electrolyte conductive of lithium ions is a microporous polymer impregnated with lithium containing organic liquid.
- 30 9. A rechargeable lithium battery as claimed in claim 1, wherein the carbonaceous particles capable of intercalating lithium ions are selected from the group consisting of: petroleum coke, glassy carbon particles, graphite particles and carbon particles of less than 60 μ size.

~~10. A rechargeable lithium battery as claimed in claim 1,~~
having cobalt oxide as a transition metal compound capable of
incorporating lithium ions in its structure, said cobalt oxide
having cathode specific reversible capacity in the range of
5 123±5 mAh/g.

11. A rechargeable lithium battery as claimed in claim 1,
having manganese oxide as a transition metal compound capable
of incorporating lithium ions in its structure, said manganese
oxide having cathode specific reversible capacity in the
10 range of 142±5 mAh/g.

12. A rechargeable lithium battery as claimed in claim 1,
having nickel oxide as a transition metal compound capable of
incorporating lithium ions in its structure, said nickel oxide
having cathode specific reversible capacity in the range of
15 ~~447±5 mAh/g.~~