Lithium-ion battery capacitor patent

What is a lithium ion capacitor?
A lithium-ion capacitor (LIC or LiC) is a hybrid type of capacitorclassified as a type of supercapacitor. It is called a hybrid because the anode is the same as those used in lithium-ion batteries and the cathode is the same as those used in supercapacitors. Activated carbon is typically used as the cathode.

Why are LIC capacitors better than lithium ion batteries?
LIC's have higher power densitiesthan batteries,and are safer than lithium-ion batteries,in which thermal runaway reactions may occur. Compared to the electric double-layer capacitor (EDLC),the LIC has a higher output voltage. Although they have similar power densities,the LIC has a much higher energy density than other supercapacitors.

Why is a lithium ion battery called a hybrid?
It is called a hybrid because the anode is the same as those used in lithium-ion batteries and the cathode is the same as those used in supercapacitors. Activated carbon is typically used as the cathode. The anode of the LIC consists of carbon material which is often pre-doped with lithium ions.

Are lithium ion capacitors good for cold environments?
Lithium-ion capacitors offer superior performancein cold environments compared to traditional lithium-ion batteries. As demonstrated in recent studies,LiCs can maintain approximately 50% of their capacity at temperatures as low as -10°C under high discharge rates (7.5C).

What is a negative electrode in a lithium ion battery?
The negative electrode or anodeof the LIC is the battery type or high energy density electrode. The anode can be charged to contain large amounts of energy by reversible intercalation of lithium ions. This process is an electrochemical reaction.

What are high-power and long-life lithium-ion capacitors made of?
"High-power and long-life lithium-ion capacitors constructed from N-doped hierarchical carbon nanolayer cathode and mesoporous graphene anode". Carbon. 140: 237-248. Bibcode: 2018Carbo.140..237L. doi: 10.1016/j.carbon.2018.08.044. ISSN 0008-6223. S2CID 105028246.

A hybrid lithium-ion battery-capacitor (H-LIBC) energy storage device includes a hybrid composite cathode electrode having a lithium ion battery (LIB) cathode active material and a lithium ion ...

The present invention relates to a lithium ion capacitor in which a lithium salt contained in an electrolytic solution is used as a source of lithium ions and lithium ions are pre-doped to a cathode from a lithium salt. A lithium ion capacitor according to the present invention includes an anode and a cathode for performing ion exchange with a cathode, an anode and an anode immersed ...

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Lithium-ion battery pack. Super Capacitor. ... Valid patent 370 + ... Shandong Goldencell Electronics Technology Co.,Ltd is a leading Lithium-ion battery manufacturer which integrates R& D, manufacturing, sales and services of ...

this pending patent application publication describes the process for lithiating negative electrodes for lithium ion electrochemical cells, it does not include the use of thin Li films having holes to be used in the method of negative electrode pre-lithiation or the manufacture of lithium loaded negative electrodes for a lithium-ion capacitor by lamination with a carbon electrode material ...

The lithium-ion battery (LIB) has become the most widely used electrochemical energy storage device due to the advantage of high energy density. However, because of the low rate of ...

Lithium ion battery is single through disassembling the shell, the diaphragm material composition that obtain, is easy to reclaim is more that the positive pole of relevant battery, negative material reclaim the document patent in field, and anodal recovery method mainly contains: 1. hydrometallurgy; 2. pyrometallurgy; 3. electrochemical process etc.The negative pole recovery ...

A lithium ion capacitor is a novel electrical storage element which can achieve both superior output characteristic and high energy density, by carrying out charge/discharge based on the ...

A lithium-ion capacitor (LIC) is provided which includes positive electrodes, negative electrodes pre-loaded on surface with lithium sources including lithium strips and ultra-thin lithium films having holes, separators and organic solvent electrolyte with lithium salt for high performance including high energy density, high power density, long cycle life, long DC life and wide ...

A lithium-ion battery includes a graphite-based material for negative electrode, a lithium-rich material for positive electrode, an electrolyte and a separator. The reversible capacity (N) of the negative electrode is equal to the reversible capacity (P) of the positive electrode so that the battery exhibits a ratio N/P=1.

Therefore, to meet the needs of energy storage devices in different fields, it is of great significance to develop high-performance energy storage electrochemical devices based on the lithium-ion battery and lithium-ion capacitor technology [18], [19], [20].

The present invention relates to lithium-ion capacitors (LICs) that include positive electrodes, negative electrodes pre-loaded on surface with lithium sources including lithium strips and ...

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