

LITHIUM POLYMER ELECTROLYTE BATTERY FOR SUB-AMBIENT TEMPERATURE APPLICATIONS

ABSTRACT

A primary lithium battery (10) particularly adapted for use in self-contained self-powered devices (SSPD) for mobile communication and computing products, such as radio frequency identification tags, PCMCIA cards, and smart cards. The battery has a flexible and compact design, and utilizes a solid polymer electrolyte membrane (16) that preferably has a polyacrylonitrile matrix. Performance of the electrolyte membrane is optimized by controlling the amount of aprotic organic solvents within the membrane within a prescribed range of ratios. In so doing, the performance characteristics of the battery closely approximate that of conventional liquid electrolytes without the safety hazards associated with the risk of liquid electrolyte leakage, and exhibit enhanced performance at sub-ambient temperatures. A further feature is that the battery's cathode (18) is encapsulated within a polymeric matrix that eliminates the exposure hazard posed by lithium intercalation compounds used within the cathode.

Fig. 1