

Safer Electrolytes for Lithium-Ion Cells

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A number of nonvolatile, low-flammability liquid oligomers and polymers based on aliphatic organic carbonate molecular structures have been found to be suitable to be blended with ethylene carbonate to make electrolytes for lithium-ion electrochemical cells. Heretofore, such electrolytes have often been made by blending ethylene carbonate with volatile, flammable organic carbonates. The present nonvolatile electrolytes have been found to have adequate conductivity (about 2 mS/cm) for lithium ions and to remain liq-

uid at temperatures down to -5°C . At normal charge and discharge rates, lithium-ion cells containing these nonvolatile electrolytes but otherwise of standard design have been found to operate at current and energy densities comparable to those of cells now in common use. They do not perform well at high charge and discharge rates — an effect probably attributable to electrolyte viscosity. Cells containing the nonvolatile electrolytes have also been found to be, variously, nonflammable or at least self-extinguishing. Hence, there ap-

pears to be a basis for the development of safer high-performance lithium-ion cells.

*This work was done by Joe Kejha, Novis Smith, and Joel McCloskey of LithChem for **Glenn Research Center**. Further information is contained in a TSP (see page 1).*

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Commercial Technology Office, Attn: Steve Fedor, Mail Stop 4-8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-17398.