

Opportunity

These technologies provide a variety of unique capabilities to makers of high-power battery systems. Individually or as a package, each offers unique features that provide benefits over a range of operating temperatures.

In addition to use in batteries, applications to electrochromics, displays, and super capacitors are also practicable.

Technology

Key aspects of the technology are described below. In general, the features focus on:

- Electrolyte composition and electrode processing
- Additives for conductivity and electrical property enhancement
- Proven expertise especially relevant to military and defense applications.

Intellectual property

The technologies are backed by strong intellectual property positions held by DERA, the U.K.'s Defence Evaluation and Research Agency. DERA is an agency of the U.K. Ministry of Defence incorporating the bulk of the U.K.'s non-nuclear research, technology, and test and evaluation establishments.

With a turnover of more than £1.6 billion, DERA is Europe's largest research organization. Among its 12,000 staff, DERA employs many leading scientists and internationally acclaimed experts. The organization collectively offers a unique and powerful range of services, from the highest level of operational studies and analysis, through the various categories of basic and applied research.

| <i>Title</i> | <i>Patent</i> | <i>Key Features</i> |
|--|---|---|
| Foam Matrix Organic Salt Electrolytes by K.J. Green & J. C. Wilson | WO 98/11619 | <ul style="list-style-type: none"> • Imidazolium or pyridinium alkyl sulfonate and alkali borate salt stabilized in acrylic polymer solid electrolyte • Good charge retention • Operating range: 20-120 degC • Applications in super capacitors; electrochromics and displays; as well as batteries |
| Dipyrrylmethane electrical conductor by J.R.M. Giles | US 4,781,443 | <ul style="list-style-type: none"> • Claims cover the polymer and process for making and using it as an electrode • Air and water stable • One embodiment with CF₃SO₃ additive (n- or p-dopant) exhibits conductivity of ~1.0 S/cm • Cited by 18 later patents |
| High temperature battery by A.G. Ritchie | WO 96/08845 Application PCT/GB95/02140 now issued as US 5,895,730 | <ul style="list-style-type: none"> • LiX + Li compounds, mainly for Li-FeS₂ systems • Lithium sulfate additive depresses melting point of electrolyte from 500 to 430 degC • Stable voltage for short burst power (e.g. missiles) • Reserve systems useful for submarine & EV power supplies |

For more information, contact:

Michael F. Allan
 FIRST PRINCIPALS, INC.
 1768 East 25th Street
 Cleveland, OH 44114
 Tel: 216-881-8526
 Fax: 216-881-8522
 Email: mfallan@firstprincipals.com