JOHN B. KERR
Lawrence Berkeley National Laboratory
MS 62R0203, 1 Cyclotron Road,
Berkeley, CA 94720
(510)-486-6279 FAX: (510)-486-4995
e-mail: jbkerr@lbl.gov

Web Page: http://energy.lbl.gov/aet/kerr/

EDUCATION.

- Ph.D. University of Edinburgh , Scotland, 1978. Thesis Title, "Electrochemical Reduction of some Unsaturated Organic Chemicals." Advisor A.J. Bellamy.
- Recipient of a NATO Studentship at the University of Aarhus, Denmark with P.E. Iversen and H. Lund, 1975-76 and at the Universite de Dijon, France with C. Degrand and E. Laviron,, 1976.
- B.Sc.,Honours, 1st Class in Chemistry , University of Edinburgh , Scotland, 1974.
- January 1978 - July 1979. Research Associate at the Department of Chemistry, University of Minnesota, Minneapolis with L.L. Miller. i) polymer coated electrodes and their catalytic properties. ii) oxidative cyclization of morphinandienone alkaloids, bibenzyls and cyclophanes.
- September 1979-September 1980. Research Fellow, Department of Chemistry, University of Southampton, England with D. Pletcher. Electrocatalytic properties of macrocylic transition metal complexes.

Appointments

Staff Scientist, Lawrence Berkeley National Laboratory, 1994-Present.
Associate Director of Research, Aquanautics Corporation, Alameda, CA, 1986-1993.
Senior Research Fellow, PPG Industries, Inc., Barberton, OH, 1984-1986,
Staff Electrochemist, EverReady Battery Division, Union Carbide Corporation, Westlake, OH, 1982-1984.
Senior Research Chemist, Hooker Chemical Company, Grand Island, NY, 1980-1982.
Postdoctoral Fellow, University of Southampton, England, 1979-80.
Postdoctoral Fellow, University of Minnesota, MN, 1978-1979.

Publications and Patents

1 Driscoll, P. F., Deunf, E., Rubin, L., Arnold, J. & Kerr, J. B. Electrochemical Redox Catalysis for Electrochemical Dehydrogenation of Liquid Hydrogen Carrier Fuels for Energy Storage and Conversion. Journal of the Electrochemical Society 160, G3152-G3158, doi:10.1149/2.024307jes (2013).
2 Zhu, X. et al. Bridge to Fuel Cell Molecular Catalysis: 3D Non-Platinum Group Metal Catalyst in MEAs. ECS Transactions 45, 143-152 (2012).
3 Ward, A. L., Elbaz, L., Kerr, J. B. & Arnold, J. Nonprecious Metal Catalysts for Fuel Cell Applications: Electrochemical Dioxygen Activation by a Series of First Row

Transition Metal Tris(2-pyridylmethyl)amine Complexes. Inorg Chem 51, 4694-4706, doi:10.1021/ic2026957 (2012).
4 He, Q. et al. Molecular catalysis of the oxygen reduction reaction by iron porphyrin catalysts tethered into Nafion layers: An electrochemical study in solution and a membrane-electrode-assembly study in fuel cells. J Power Sources 216, 67-75, doi:10.1016/j.jpowsour.2012.05.043 (2012).
5 Driscoll, P. et al. Redox Catalysis for Dehydrogenation of Liquid Hydrogen Carrier Fuels for Energy Storage and Conversion. ECS Transactions 35, 3-17 (2011).
6 Rozenel, S. S., Kerr, J. B. & Arnold, J. Metal complexes of Co, Ni and Cu with the pincer ligand HN(CH(2)CH(2)P(i)Pr(2))(2): preparation, characterization and electrochemistry. Dalton Transactions 40, 10397-10405, doi:10.1039/c1dt10599j (2011).
7 Potrekar, R. A., Clark, K. T., Zhu, X. & Kerr, J. B. Blend Membranes of Highly Phosphonated Polysulfone and Polybenzimidazoles for High Temperature Proton Exchange Membrane Fuel Cells. ECS Transactions 41, 2147-2159 (2011).
8 Zhu, X. et al. Ionic-Crosslinked Interpenetrating Polymer Network (IPN) Membranes for Anhydrous High Temperature Polymer Electrolyte Fuel Cells Based on PFSA Ionomer and Functionalized Polysiloxane. ECS Transactions 41, 2135-2145 (2011).
9 Yang, L., Zhang, H., Driscoll, P. F., Lucht, B. & Kerr, J. B. Six-Membered-Ring Malonatoborate-Based Lithium Salts as Electrolytes for Lithium Ion Batteries. ECS Transactions 33, 57-69 (2011).
10 Driscoll, P. F., Yang, L., Gervais, M. & Kerr, J. B. Polyelectrolyte Membranes Containing Lithium Malonato(difluoro)borate for Lithium-Ion Systems. ECS Transactions 33, 33-53 (2011).
11 Saint, J. et al. Compatibility of LixTiyMn1-yO2 (y=0, 0.11) electrode materials with pyrrolidinium-based ionic liquid electrolyte systems. Journal of the Electrochemical Society 155, A172-A180 (2008).
12 Hardwick, L. J., Marcinek, M., Beer, L., Kerr, J. B. & Kostecki, R. An investigation of the effect of graphite degradation on irreversible capacity in lithium-ion cells. Journal of the Electrochemical Society 155, A442-A447 (2008).
13 Delacourt, C., Ridgway, P. L., Kerr, J. B. & Newman, J. Design of an electrochemical cell making syngas (CO+H-2) from CO2 and H2O reduction at room temperature. Journal of the Electrochemical Society 155, B42-B49 (2008).
14 Shin, J. H., Basak, P., Kerr, J. B. & Cairns, E. J. Rechargeable Li/LiFePO4 cells using N-methyl-N-butyl pyrrolidinium bis(trifluoromethane sulfonyl)imide-LiTFSI electrolyte incorporating polymer additives. Electrochimica Acta 54, 410-414 (2008).
15 Salminen, J. et al. Physicochemical properties and toxicities of hydrophobic piperidinium and pyrrolidinium ionic liquids. Fluid Phase Equilibria 261, 421-426 (2007).
16 Sun, X. G. & Kerr, J. B. Synthesis and characterization of network single ion conductors based on comb-branched polyepoxide ethers and lithium bis(allylmalonato)borate. Macromolecules 39, 362-372, doi:10.1021/ma0507701 (2006).
17 Sun, X. G., Hou, J. & Kerr, J. B. Comb-shaped single ion conductors based on polyacrylate ethers and lithium alkyl sulfonate. Electrochimica Acta 50, 1139-1147 (2005).

18 Sun, X. G., Reeder, C. L. & Kerr, J. B. Synthesis and characterization of network type single ion conductors. Macromolecules 37, 2219-2227 (2004).
19 Sun, X. G., Liu, G., Xie, J. B., Han, Y. B. & Kerr, J. B. New gel polyelectrolytes for rechargeable lithium batteries. Solid State Ionics 175, 713-716 (2004).
20 Xie, J. B., Duan, R. G., Han, Y. B. & Kerr, J. B. Morphological, rheological and electrochemical studies of Poly(ethylene oxide) electrolytes containing fumed silica nanoparticles. Solid State Ionics 175, 755-758 (2004).
21 Liu, G., Reeder, C. L., Sun, X. G. & Kerr, J. B. Diffusion coefficients in trimethyleneoxide containing comb branch polymer electrolytes. Solid State Ionics 175, 781-783 (2004).
22 Sun, X. G., Reeder, C. L., Kerr, J. B. & DesMarteau, D. D. Synthesis and characterization of comb shape single ion conductors based on polyepoxide ethers and perfluorinated lithium salts. Abstr Pap Am Chem S 228, U352-U352 (2004).
23 Sun, X. G., Kerr, J. B., Liu, G., Reeder, C. L. & Han, Y. B. Ionic conductivity, electrochemical and viscoelastic properties of network single ion conductors based on polyepoxide ethers and lithium bis(allylmalonato)borate. Abstr Pap Am Chem S 228, U330-U330 (2004).
24 Sun, X. G., Kerr, J. B., Reeder, C. L., Liu, G. & Han, Y. B. Network single ion conductors based on comb-branched polyepoxide ethers and lithium bis(allylmalonato)borate. Macromolecules 37, 5133-5135 (2004).
25 Liu, G., Kerr, J. B. & Johnson, S. Dark spot formation relative to ITO surface roughness for polyfluorene devices. Synthetic Met 144, 1-6 (2004).
26 Matsumiya, Y., Balsara, N. P., Kerr, J. B., Inoue, T. & Watanabe, H. In situ dielectric characterization of poly(ethylene oxide) melts containing lithium perchlorate under steady shear flow. Macromolecules 37, 544-553 (2004).
27 Liu, G., Kerr, J. B., Reeder, C. & Sun, X. G. New polymeric proton conductors for water-free and high temperature fuel cells. Abstr Pap Am Chem S 228, U661-U661 (2004).
28 Kerr, J. B. et al. Interfacial behavior of polymer electrolytes. Electrochimica Acta 50, 235-242 (2004).
29 Herstedt, M., Abraham, D. P., Kerr, J. B. & Edstrom, K. X-ray photoelectron spectroscopy of negative electrodes from high-power lithium-ion cells showing various levels of power fade. Electrochimica Acta 49, 5097-5110 (2004).
30 Sloop, S. E., Kerr, J. B. & Kinoshita, K. The role of Li-ion battery electrolyte reactivity in performance decline and self-discharge. J Power Sources 119, 330-337 (2003).
31 Kerr, J. B. et al. From molecular models to system analysis for lithium battery electrolytes. J Power Sources 110, 389-400 (2002).
32 Kerr, J. B., Liu, G., Curtiss, L. A. & Redfern, P. C. Towards Room Temperature Performance for Lithium-Polymer Batteries. Electrochimica Acta In Press (2002).
33 Lo, H. C. & Fish, R. H. Biomimetic NAD(+) models for tandem cofactor regeneration, horse liver alcohol dehydrogenase recognition of 1,4-NADH derivatives, and chiral synthesis. Angewandte Chemie-International Edition 41, 478-481 (2002).
34 Sloop, S. E., Pugh, J. K., Wang, S., Kerr, J. B. & Kinoshita, K. Chemical reactivity of PF5 and LiPF6 in ethylene carbonate/dimethyl carbonate solutions. Electrochemical and Solid State Letters 4, A42-A44 (2001).

35 Zhang, X. et al. Diagnostic characterization of high power lithium-ion batteries for use in hybrid electric vehicles. Journal of the Electrochemical Society 148, A463-A470 (2001).
36 Lo, H. C. et al. Bioorganometallic chemistry. 13. Regioselective reduction of NAD(+) models, 1-benzylnicotinamde triflate and beta-nicotinamide ribose-5 '-methyl phosphate, with in situ generated [CP*Rh(Bpy)H](+): Structure-activity relationships, kinetics, and mechanistic aspects in the formation of the 1,4-NADH derivatives. Inorg Chem 40, 6705-6716 (2001).
37 Doeff, M. M., Edman, L., Sloop, S. E., Kerr, J. & De Jonghe, L. C. Transport properties of binary salt polymer electrolytes. J Power Sources 89, 227-231 (2000).
38 Buriez, O. et al. Performance limitations of polymer electrolytes based on ethylene oxide polymers. J Power Sources 89, 149-155 (2000).
39 Thomas, K. E., Sloop, S. E., Kerr, J. B. & Newman, J. Comparison of lithium-polymer cell performance with unity and nonunity transference numbers. J Power Sources 89, 132-138 (2000).
40 Wen, S. J., Kerr, J., Rubin, M., Slack, J. & von Rottkay, K. Analysis of durability in lithium nickel oxide electrochromic materials and devices. Solar Energy Materials and Solar Cells 56, 299-307 (1999).
41 Lo, H. C., Buriez, O., Kerr, J. B. & Fish, R. H. Regioselective reduction of NAD(+) models with [Cp*Rh(bpy)H](+): Structure-activity relationships and mechanistic aspects in the formation of the 1,4-NADH derivatives. Angewandte Chemie-International Edition 38, 1429-1432 (1999).
42 Kerr, J. B. et al. Effect of structure on ion transport in polymer electrolytes. Abstr Pap Am Chem S 217, U500-U500 (1999).
43 Kerr, J. B. et al. Reactivity of polymer electrolytes in rechargeable lithium batteries. Abstr Pap Am Chem S 217, U505-U505 (1999).
44 Rubin, M. et al. Electrochromic lithium nickel oxide by pulsed laser deposition and sputtering. Solar Energy Materials and Solar Cells 54, 59-66 (1998).
45. J. P. Ciccone, L. A. Deardurff, E. De Castro, J. B. Kerr and B. D. Zenner, Electrochemistry of some Synthetic Oxygen Carrier Molecules in Water, Redox Chemistry and Interfacial Behavior of Biological Molecules, Plenum (1988), 397.
46. J. B. Kerr, Some Chemical and electrochemical reactions of 2-methyltetrahydrofuran with Lithium, J. Electrochemical Soc., 132 (1985), 2839.
47. Organic Electrochemistry," Chapter 5, Specialist Periodical Reports, Electrochemistry Vol. 10, Ed. D. Pletcher, pp. 171-214 (1985)
48 ."The electrochemistry of square planar macrocyclic nickel complexes and the reaction of Ni (I) with alkyl bromides: Tetradentate Schiff base complexes," G. Cosden, J. B. Kerr, D. Pletcher and R. Rosas, Journal of Electroanalytical Chemistry and Interfacial Electrochemistry, 117 (1981), 107.
49. ."The electrochemistry of square planar macrocyclic nickel complexes and the reaction of Ni (I) with alkyl bromides: nickel tetraamine complexes," J. Y. Becker, J. B. Kerr, D. Pletcher and R. Rosas, Journal of Electroanalytical Chemistry and Interfacial Electrochemistry, 117 (1981), 101.
50. ."A poly-p-nitrostyrene of platinum electrode. Polymer charging kinetics and electrocatalysis of organic dihalide reductions," J. B. Kerr, L. L. Miller and M. R. Van DeMark, Journal of the American Chemical Society, 102 (1980), 3833.

51. ."A mechanistic study of anodic intramolecular coupling reactions," J. B. Kerr, T. C. Jempty and L. L. Miller, Journal of American Chemical Society, 101 (1979), 7338.
52.."Electrocatalysis of organic dihalide reductions using a polymer modified electrode," J. B. Kerr and L. L. Miller, Journal of Electroanalytical Chemistry and Interfacial Electrochemistry, 101 (1979), 263.
53. ."Cyanomethylation during the electroreduction of aromatic carbonyl compounds in acetonitrile," A.J. Bellamy, J.B. Kerr, C.J. McGregor and I.S. MacKirdy, J. Chem. Soc., Perkin Trans 2, (1982), 425.
54. ."Cyanomethylation versus reductive saturation and hydrodimerisation during the electroreduction of unsaturated nitriles in acetonitrile," E.M. Abbott, A.J. Bellamy, J.B. Kerr and I.S. MacKirdy, J. Chem. Soc., Perkin Trans 2, (1982), 167.
55. ."Electrochemical reductive ring cleavage of 1-cyclopropylethylindenemalonitriles," A.J. Bellamy and J.B. Kerr, Acta Chemica Scandinavica, B33 (1979), 370.
56. ."Electrochemical reduction of some cyclic immonium salts in aprotic media," J.B.Kerr and P.E. Iversen, Acta Chemica Scandinavica, B32 (1979), 405.
57. ."Direct conversion of aromatic carbonyl compounds into 3-substituted propionitriles and glutaronitriles by electrochemical reduction in acetonitrile," E.M. Abbott, A.J. Bellamy and J. Kerr, Chemistry and Industry (1974), 828.

Patents

1. “Polymeric electrolytes based on hydrosilyation reactions”, Shanger Wang, Jun Hou, Steve E. Sloop, Yong Bong Han and John B. Kerr; USP 7,101,643, September 5, 2006.
2. “Single ion conductor cross-linked polymeric networks”, Shanger Wang, Jun Hou, Steve E. Sloop, Yong Bong Han and John B. Kerr; USP 6,956,083, October 18, 2005.
3. “Agents for replacement of NAD+/NADH system in enzymatic reactions,” Richard H. Fish, Christine H. Lo and John B. Kerr. USP 6,716,596 April 6, 2004.
4. “Electrochemical storage cell containing a substituted anisole or di-anisole redox shuttle additive for overcharge protection and suitable for use in liquid organic and solid polymer electrolytes”, John B. Kerr and Minmin Tian. US Patent no. 6,045,952 (2000).
5. “Macrocyclic Amine Complexes for Ligand Extraction and Generation,” E. De Castro, J. P. Ciccone, John B. Kerr, USP 4,952,289 (1990).
6. “Polyalkylamine Complexes for Ligand Extraction and Generation,” E. De Castro, B. D. Zenner, J. P. Ciccone, L. A. Deardurff, and J. B. Kerr, USP 4,959,135 (1990).
7. “Methods and System for Extracting Oxygen Employing Electrocatalysts,” E. De Castro, J. Kerr and B. Zenner, USP 5,017,274(1990).