

**Resume of
Timothy D. Burchell**

I. PERSONAL

A. Date and Place of Birth:

January 8, 1958; West Ham, England

B. Nationality:

USA

C. Present Home Address:

109 Greywood Place
Oak Ridge, Tennessee 37830, USA

D. Present Position:

Leader, Carbon Materials Technology Group
Oak Ridge National Laboratory, Oak Ridge, TN 37831-6088, USA.

II. EDUCATION

<u>Degrees</u>	<u>University</u>	<u>Dates</u>
B.Sc (Hons) [Materials Science]	University of Bath, UK.	1978-1981
Ph.D [Studies of Fracture in Nuclear Graphite]	University of Bath, UK	1983-1986

III. ACADEMIC HONORS AND AWARDS

Pergamon Prize for best paper published in CARBON journal, 1986-1987

Duke of Edinburgh's Gold Award 1983 (for demonstrated civic responsibility and achievement)

Member, Scientific Advisory Board of Center for Fibers and Films, Clemson University

Plenary Lecturer, CARBON '96 Conference, Newcastle Upon Tyne, UK. July 1996.

ORNL/Lockheed Martin Technical Achievement Award, 1998

Resume of Timothy D. Burchell

ORNL/Lockheed Martin Engineer of the Year, 1998

R&D-100 Award, 1999 (Self-Cleaning Carbon Air Filter)

R&D-100 Award, 2000 (ORNL High Thermal Conductivity Graphite Foam)

SAE International "Excellence in Oral Presentation", June 2000

Federal Laboratory Consortium for Technology Transfer 2000 Award for Excellence in Technology Transfer

Federal Laboratory Consortium for Technology Transfer 2001 Award for Excellence in Technology Transfer

Federal Laboratory Consortium for Technology Transfer 2003 Award for Excellence in Technology Transfer

American Carbon Society 2002/03 Graffin Lecturer

Battelle Distinguished Inventor

IV. PROFESSIONAL EXPERIENCE

1974-1978	Technician Apprentice, Plessey Aerospace, Titchfield, England.
1981-1983	Metallurgist, Plessey Aerospace, Titchfield, England.
1986-1988	Research Officer, CEBG Berkeley Nuclear Laboratories, Berkeley, England.
1989-1991	Research Staff Member, Oak Ridge National Laboratory, Oak Ridge, USA.
1991-Present	Leader, Carbon Materials Technology Group, ORNL, USA.

V. PROFESSIONAL SERVICE

A. Membership in Professional Societies: The Institute of Materials, Minerals and Mining; The American Carbon Society; American Society for the Testing and Materials;

B. Meeting Committee Memberships: Organizing Committee, Fifth International Conference on Fusion Reactor Materials (ICFRM-5), Program Committee ICFRM-5, Program Chairperson, Industrial Applications Session, 20th Biennial Conference on Carbon. Advisory Committee, Workshop on Coal Derived Graphite, Coke and Pitch, West Virginia University. Chairman of 1994 American Carbon Society Workshop entitled "Carbon Materials For Advanced Technologies". Program Chairperson, Industrial Applications Session, 22nd Biennial Conference on Carbon. Member, International Advisory/Program Committee, IAEA Specialists Meeting on Graphite Moderator Lifecycle Technologies. Technical Program Chair, 24th Biennial Conference on Carbon, Charleston, SC. June, 1998. Chairman, INGSM-1 (2000), Technical Program Committee Member-INGSM-VI (2005).

Resume of Timothy D. Burchell

C. Society Service:

- I. Member, Council of the Institute of Materials (1988).
- II. Member of Advisory Board of the American Carbon Society (1993-99).
- III. Awards Committee Chair, American Carbon Society (1996-2002).
- IV. Secretary/Treasurer, American Carbon Society (1999-2004)
- V. Technical Program Chair, 24th Biennial Conf on Carbon, CARBON '99, July 1999, Charleston SC.
- VI. Member of ASTM D02-F Committee on Manufactured Carbons and Graphites (1988-present).
- VII. Sub-Committee Chair ASTM D02-F2 on Nuclear Graphite (2000-2003).
- VIII. Chair ASTM Committee D02-F on Manufactured Carbon and Graphite (2002 – present).
- IX. Chair, ASME Project Team on Graphite Core Support Structures (2004-present)
- X. Chair, Seventh International Nuclear Graphite Specialist's Meeting (INGSM-VII), September 10-13, 2006
- XI. Chair, CARBON 2007 Conference, Seattle WA, July 15-20, 2007

D. Associate Editor, **CARBON** (1995-2003)

E. Editor, **CARBON** (2003-present)

F. Member, Scientific Advisory Board of National Center for Fibers and Films, Clemson University, Clemson SC., USA.

G. American Carbon Society 2002/03 Graffin Lecturer

H. Member for the USA on the IAEA Nuclear Graphite Irradiated Properties Database Steering Committee

I. International Coordinator for the Graphite R&D Tasks (Gen IV Very High Temperature Reactor Project Management Board for Materials)

VI. RESEARCH INTERESTS

Graphite, carbon-carbon composites, and carbon fiber properties. The effects of neutron irradiation on the mechanical and physical properties of graphite. Graphite irradiation creep behavior. Modeling of properties. Fracture of graphite. Acoustic emission. Application of NDE to graphites and carbon-carbon composites. Development of carbon-carbon composites for nuclear applications. Adsorbent carbons, including carbon fibers and fibrous monoliths. High temperature nuclear fuels.

VII PATENTS

US Patent Number 5,332,601, Jul 26, 1994

US Patent Number 5,744,075, Apr 28, 1998

US Patent Number 5,827,355, Oct 27, 1998

US Patent Number 5,871,838, Feb 26, 1999

Resume of Timothy D. Burchell

US Patent Number 5,912,424, Jun 15, 1999
US Patent Number 5,925,168, Jul 20, 1999
US Patent Number 5,972,077, Oct 26, 1999
US Patent Number 6,030,698, Feb 29, 2000
US Patent Number 6,037,032, Mar 14, 2000
US Patent Number 6,037,073, Mar 14, 2000
US Patent Number 6,090,477, Jul 18, 2000
US Patent Number 6,171,720, Jan 9, 2001
US Patent Number 6,258,300, Jul 10, 2001
US Patent Number 6,375,716, Apr 23, 2002
US Patent Number 6,339,149, Jun 4, 2002
US Patent Number 6,475,411, Nov 5, 2002
US Patent Number 6,673,328, Jan 6, 2004
US Patent Number 6,780,505, Aug 24, 2004

VIII. OPEN LITERATURE PUBLICATIONS

T. D. Burchell, R. G. Cooke, B. McEnaney and I. M. Pickup. Acoustic Emission from Graphite - the Effect of Texture. In **Ext. Abs. & Prog. Carbone 84, Bordeaux, France. July 2-6,1984, p.110.**

T. D. Burchell, R. G. Cooke, B. McEnaney and I. M. Pickup. The Influence of Radiolytic and Thermal Oxidation on the Mechanical Properties of Nuclear Graphites. In **Ext. Abs. & Prog. 17th Biennial Conf. on Carbon, Lexington, Kentucky, USA. June 16-21, 1985, p.336.**

T. D. Burchell, B. McEnaney, A. P. G. Rose and M. O. Tucker. The influence of Grain Size Distribution on a Fracture Criterion for Graphites. **ibid p.346.**

T. D. Burchell, R. G. Cooke, B. McEnaney and I. M. Pickup. Acoustic Emission from Polygranular Graphites. **CARBON Vol. 23, No. 6, pp. 739-747, 1985.**

T. D. Burchell, B. McEnaney, M. O. Tucker and A. P. G. Rose. A Microstructural Study of Dynamic Crack Propagation in Nuclear Graphites. In **Ext. Abs. & Prog. Carbon 86, Baden -Baden, FRG. June 6 - July 4, 1986. p. 265.**

M. O. Tucker, A. P. G. Rose and T. D. Burchell. The Fracture of Polygranular Graphites. **CARBON Vol. 24, No. 5, pp. 582-602, 1986. PERGAMON PRIZE WINNER.**

T. D. Burchell, I. M. Pickup, B. McEnaney and R. G. Cooke. The Relationship Between Microstructure and the Reduction of Elastic Modulus in Thermally and Radiolytically Corroded Nuclear Graphites. **CARBON Vol.24, No.5, pp. 545-549, 1986.**

T. D. Burchell, A. P. G. Rose and B. McEnaney. Acoustic Emission from Irradiated Nuclear Graphite. **Journal of Nuclear Materials Vol. 140, No.1, pp.11-18, Aug. 1986.**

T. D. Burchell and A. J. Wickham. The Dimensional Change in Pile Grade A Graphite Irradiated in CEGB Magnox Power Reactors. In **Ext. Abs. & Prog. 18th Biennial Conf. on Carbon, Worcester, Mass., USA. July 16-20, 1987. p. 245.**

Resume of Timothy D. Burchell

- T.D. Burchell and M. O. Tucker. A New Fracture Criterion for Nuclear Graphites. **ibid p.486.**
- T. D. Burchell and A. P. G. Rose. The Influence of Irradiation on the Acoustic Emission of a Nuclear Graphite. **ibid p. 488.**
- T. D. Burchell, M. O. Tucker and B. McEnaney. Qualitative and Quantitative Studies of Fracture in Nuclear Graphites. **In Proc. Conf. on Materials for Reactor Core Applications. British Nuclear Energy Society. Oct. 17-29, 1987. Bristol, UK. p. 95.**
- T. D. Burchell. Ultrasonic Studies of a Nuclear Graphite. **In Ext. Abs & Proc. Carbon 88, Newcastle upon Tyne, UK. p. 552.**
- T. D. Burchell, T. Oku and M. Eto. A Comparison of Fracture Toughness Measurement Techniques as Applied to Nuclear Graphite. **In Ext. Abs. & Prog. Carbone 90, Paris, France. July 16-20, 1990. p. 278.**
- E. L Fuller, Jr., B. R. Chilcoat, T. D. Burchell, T. Oku and M. Eto. Chemical and Morphological Effects in the Reaction of Graphite with Water Vapor. **ibid p. 534.**
- M. Eto, S. Ishiyama, Y. Nishiyama, T. Oku and T. D. Burchell. Fracture Toughness of a Fine Grained Nuclear Graphite by Means of Various Methods. **In Proc. International Symposium on Carbon - New Processing and New Applications, Tsukuba, Japan, Nov 4-8, 1990.**
- T. D. Burchell and W. P. Eatherly. The Effects of Radiation Damage on the Properties of GraphNOL N3M. **J. Nucl. Mater. Vol. 179-181, pp. 205-208, 1991.**
- D. J. Varacalle, Jr., H. Herman, G. A. Bancke, T. D. Burchell and G. R. Romanoski. Vacuum Plasma Sprayed Silicon Coatings. **Surface and Coatings Technology, Vol. 49, pp. 24-30, 1991.**
- T. D. Burchell, E. L. Fuller, Jr., G. R. Romanoski, Jr. and J. P. Strizak. Graphite for the Nuclear Industry. **In Proc. Workshop on Coal Derived Graphite, Coke and Pitch. West Virginia University, May 2-3, 1991.**
- T. D. Burchell, W. P. Eatherly, G. W. Hollenberg, O. D. Slagle and R. D. Watson. The Effects of Neutron Irradiation on the Structure of Carbon-Carbon Composites. **In Ext. Abs. & Prog. 20th Biennial Conf. on Carbon, UCSB, Santa Barbara, Ca, USA, June 23-28, 1991. p.598.**
- G. R. Romanoski, Jr. and T. D. Burchell. Specimen Size Effects on Fracture Toughness of Nuclear Graphites. **ibid p.584.**
- J. P. Strizak and T. D. Burchell. The Effect of Stress Volume on the Tensile Properties of Graphite. **ibid p.586.**
- R. B. Dinwiddie, T. D. Burchell and C. F. Baker. Investigation into the Effect of Heat Treatment on the Thermal Conductivity of 3-D Carbon/Carbon Composites. **ibid p.642.**
- J. W. Sapp, Jr., D. A. Bowers, R. B. Dinwiddie and T. D. Burchell. Development of High Thermal Conductivity Carbon-Carbon Composites. **ibid p. 644.**

T. D. Burchell. A Microstructurally Based Fracture Model for Nuclear Graphite. **Proceedings of the IAEA Specialists Meeting on the Present Status of Graphite Development for Gas Cooled Reactors, JAERI Tokai, Japan. September 9-12, 1991. IAEA-TECDOC-690, Feb 1993.**

G. R. Romamoski and T. D. Burchell. The Effect of Specimen Geometry and Size on the Fracture Toughness of Nuclear Graphites. **ibid.**

T. D. Burchell, W. P. Eatherly, JM. Robbins and J. P. Strizak. The Effect of Neutron Irradiation on the Structure and Properties of Carbon-Carbon Composite Materials. **J. Nucl. Mater., Vol. 191-194, pp. 295-299, 1992.**

T. D. Burchell, W. P. Eatherly and G. E. Nelson. Radiation Damage in Carbon-Carbon Composites. **In Proc. CARBON 92, Essen, Germany, July 22-26, 1992. p. 985.**

T. D. Burchell and J. P. Strizak. Modelling the Tensile Strength of H-451 Nuclear Graphite. **In Ext Abs & Proc, 21st Biennial Conf. on Carbon. SUNY at Buffalo, June 13-18, 1993. p. 687.**

Y. Q. Fei, B. McEnaney, F. J. Derbyshire and T. D. Burchell. Microstructural Characterization of 3D Carbon-Carbon Composites. 1. A systematic Observation of Structure by SEM. **ibid, p. 64.**

Y. Q. Fei, B. McEnaney, F. J. Derbyshire and T. D. Burchell. Microstructural Characterization of 3D Carbon-Carbon Composites. 2. A Quantitative Study by SEM Digital Image Analysis. **ibid, p. 66.**

T. D. Burchell. The Temperature Dependence of Thermal Conductivity in NP-MHTGR Fuel Compacts. **ibid, p. 695.**

T. D. Burchell and W. P. Eatherly. Neutron Irradiation Induced Changes in the Dimensions and Thermal Conductivity of Carbon-Carbon Composites. **ibid. p.697.**

B. T. Kelly and T. D. Burchell. Irradiation Creep in Nuclear Reactor Graphite. **ibid, p. 709.**

T. D. Burchell. Fusion Energy - A Challenge to the Carbon Material Scientist. **Energieia, Vol. 4, No. 6, 1993.**

B. T. Kelly and T. D. Burchell. The Analysis of Irradiation Creep Experiments on Nuclear Reactor Graphite. **CARBON Vol. 32, No.1, pp 119-125, 1994.**

T. D. Burchell. Irradiation Induced Structure and Property Changes in Tokamak Plasma-Facing, Carbon-Carbon Composites. **In Proc 39th SAMPE Symposium, Vol. 39, pp. 2423-2436, 1994.**

T. D. Burchell, C. E. Weaver, F. Derbyshire, Y. Fei, and M. Jagtoyen. Carbon Fiber Composite Molecular Sieves: Synthesis and Characterization. **In Proceedings of Carbon '94 International Conference, Granada, Spain, July 4-8, 1994. p. 650.**

Resume of Timothy D. Burchell

T. D. Burchell and J. P. Strizak. The Performance of a Fracture Model for Graphites. In **Proceedings of Carbon '94 International Conference, Granada, Spain, July 4-8, 1994**. p. 128.

T. D. Burchell, C. E. Weaver, F. Derbyshire, Y. Fei, and M. Jagtoyen. Carbon Fiber Composite Molecular Sieves: Activation, Pore Structure and Adsorptive Behavior. In **Proceedings of Carbon '94 International Conference, Granada, Spain, July 4-8, 1994**. p. 654.

B. T. Kelly and T. D. Burchell. Structure-Related Property Changes in Polycrystalline Graphite under Neutron Irradiation. **CARBON Vol. 32, No.3, pp 499-505, 1994**.

T. D. Burchell. Carbon Fiber Composite Molecular Sieves. In **Proceedings of Eight Annual Conference on Fossil Energy Materials, Oak Ridge, Tennessee, U.S.A., May 1994**. ORNL/FMP-94/1, CONF-9405143, pp. 63-70. Pub. Oak Ridge National Lab, U.S.A., August 1994.

F. Derbyshire, Y. Q. Fei, M. Jagtoyen, G. Kimber, M. Matheny and T. D. Burchell. Carbon Fiber Composite Molecular Sieves for Gas Separation. In *Advances in Science and Technology*, 4. *New Horizons for Materials (Proceedings of Eight CIMTEC World Ceramics Congress, Florence, Italy, June 28 - July 2, 1994.)*, P. Vincenzini, Ed. p.411. Pub. Techna, Faenza, Italy, 1995.

M. Jagtoyen, F. Derbyshire, N. Custer and T. D. Burchell. Carbon Fiber Composite Molecular Sieves for Gas Separation. In **Proceedings of the 1994 MRS Spring Meeting, San Francisco, California, April 4-8, 1994**. Vol. 344. Materials Research Society, Pittsburgh, 1994.

T. D. Burchell, J. W. Klett and C. E Weaver. A Novel Carbon Fiber Based Porous Carbon Monolith. In **Proceedings of Ninth Annual Conference on Fossil Energy Materials, Oak Ridge, Tennessee, U.S.A., May 1995**. Pub. Oak Ridge National Lab, U.S.A.. CONF-9505204, ORNL/FMP/-95/1, pp. 447-456 (1995)

T. D. Burchell. Modeling the Strength of Neutron Irradiated Graphite. In **Ext Abs & Proc, 22nd Biennial Conf. on Carbon. UCSD, July 16-21, 1995**. p. 768.

L. L. Snead and T. D. Burchell. Reduction in Thermal Conductivity due to Neutron Irradiation. **ibid, p.774**.

J. W. Klett and T. D. Burchell. Carbon Fiber Carbon Composites for Catalyst Supports. **ibid, p. 124**.

L. L. Snead and T. D. Burchell. Thermal Conductivity Degradation of Graphite due to Neutron Irradiation at Low Temperatures. **J. Nucl. Mater. 244 (1995) 222-229**.

T. D. Burchell and R. R. Judkins. Passive CO₂ Removal using a Carbon Fiber Composite Molecular Sieve, **Energy Conservation and Management** Vol. 37, Nos. 6-8, pp. 947-954 (1996)

T. D. Burchell. A Microstructurally Based Fracture Model for Polygranular Graphites, **CARBON** Vol 34 No.3, pp. 297-316 (1996)

Resume of Timothy D. Burchell

- T. D. Burchell. Radiation Damage in Carbon-Carbon Composites: Structure and Property Effects, **Physica Scripta** Vol. T64, pp. 17-25 (1996)
- T. D. Burchell. Carbon Materials for Advanced Energy Applications, In **Proc CARBON '96**. pp. 185-188, Pub. The British Carbon Group (1996).
- T. D. Burchell. A Monolithic Carbon-Fiber Based Composite Adsorbent, In **Proc. CARBON '96**. pp. 749-750, Pub. The British Carbon Group (1996).
- S. Ishiyama, T. D. Burchell, J. P. Strizak and M. Eto. The Effect of High Fluence Neutron Irradiation on the Properties of a Fine-Grained Isotropic Nuclear Graphite, **Journal of Nuclear Materials** Vol. 230, pp. 1-7 (1996).
- T. D. Burchell and R. R. Judkins. A Novel Carbon Fiber Based Material and Separation Technology, **Energy Conservation and Management** Vol. 38 Suppl., pp. S99-S104, 1997.
- T. D. Burchell, R. R. Judkins and M. R. Rogers. A Novel Parametric Swing Process for the Separation of Hydrogen from Coke Oven Waste Gas. In **Proc. US/JAPAN Joint Technical Workshop on Coal Liquefaction and Materials for Coal Liquefaction**, Penn. State University, State College Pa. USDOE (1996).
- T. D. Burchell, R. R. Judkins, M. R. Rogers and A. M. Williams. A Novel Approach to the Removal of CO₂. In **Proc. 10th An. Conf. on Fossil Energy Materials**. ORNL/FMP-96/1, CONF -9605167, Oak Ridge National Laboratory, U.S.A. pp. 135 - 148 (1996).
- G. R. Romanoski and T. D. Burchell, Method for Reinforcing Threads in Multilayer Composite Tubes and Cylindrical Structures. **Ceramic Engineering and Science Proceedings Vol. 17**, No. 4, pp. 90-97, (1996), Pub. American Ceramics Society.
- T. D. Burchell, R. R. Judkins, and M. R. Rogers. A Carbon Fiber Based Monolithic Adsorbent for Gas Separation. In **Proc. 23rd Biennial Conf. On Carbon**, July 18-23, 1996, p. 158.
- T. D. Burchell, R. R. Judkins, M. R. Rogers and A. M. Williams, A Novel Process for the Separation of Carbon Dioxide and Hydrogen Sulfide for Gas Mixtures, **CARBON**, Vol. 35, No. 9, pp. 1279-1294 (1997).
- T. D. Burchell. Radiation Effects in Graphite and Carbon-Based Materials, **MRS Bulletin**. Vol. XXII, No. 2, Feb. 1997, pp. 29-35
- Burchell, T.D. and Rogers, M.R., Carbon fiber composite molecular sieves, In **Proc. Eleventh Annual Conf. On Fossil Energy Materials**, ORNL/FMP-97/1, CONF-9705115, Oak Ridge National Lab, U.S.A., 1997, pp. 109 116.
- T. D. Burchell, R. R. Judkins, M. R. Rogers and W. S. Shaw, The Structure and Properties of Carbon Fiber Based Adsorbent Monoliths, In **Proc. International Symposium of Carbon**, p. 506, Tokyo, Japan, (1998)
- K. Nakanishi, T. Arai and T. Burchell, Assessment of Brittle Fracture Theory bases on Mesoscopic Fracture Mechanics of Multiple Grain/Pore Systems in Graphite and SIC, In **Proc. International Symposium of Carbon**, p. 332, Tokyo, Japan, (1998)

Resume of Timothy D. Burchell

T. Burchell, R. Judkins and M. Rogers, The Adsorption of Water Vapor on Carbon Fiber Composite Molecular Sieves, **In Proc 12th Annual Conf on Fossil Energy Materials**, Pub. Oak Ridge National Lab. (1998)

J. P Strizak, T. D. Burchell and M. R. Rogers, Carbon Fiber Composite Molecular Sieve and Electrical Swing Adsorption Technology for the Separation and Capture of Carbon Dioxide, **In Proc 13th Annual Conf on Fossil Energy Materials**, Pub. Oak Ridge National Lab. (1999)

T. M. Besmann, J. W. Klett, and T. D. Burchell, "Carbon Composite for a PEM Fuel Cell," in *Materials for Electrochemical Energy Storage*, eds. D. S. Ginley, D. H. Doughty, T. Takamura, Z. Zhang, and B. Scrosati, Vol. 496, Materials Research Society, Warrendale, PA 1999.

James Klett, Claudia Walls and Tim Burchell, High-Thermal-Conductivity, Mesophase-Pitch-Derived Carbon Foams: Effect of Precursor on Structure and Properties, **In Proc. 24th Biennial Conf. On Carbon**, July 11-16, 1999, p. 132

S. Hellebust, R. A. Daley, R. H. Bradley and T. D. Burchell, Carbon Fiber Monoliths: A Study of Surface Chemistry and Water Adsorption, **In Proc. 24th Biennial Conf. On Carbon**, July 11-16, 1999, p. 320

Tim Burchell and Rod Judkins, A Novel Adsorbent Carbon Fiber Composite Molecular Sieve Gas Separation Media, **In Proc. 16th Annual International Pittsburgh Coal Conference**, Pub University of Pittsburgh (1999)

James Klett, Lynn Klett, Tim Burchell, Claudia Walls, "Graphitic Foam Thermal Management Materials for Electronic Packaging", Proceedings of the Society of Automotive Engineering Future Car Congress, Crystal City, Washington, DC, April 2-6, 2000.

James Klett, Rommie Hardy, Ernie Romine, Claudia Walls, Tim Burchell, High-Thermal-Conductivity, Mesophase-Pitch-Derived Carbon Foams: Effect of Precursor on Structure and Properties, **CARBON Vol. 38(7)**, pp. 953-973 (2000).

T. D. Burchell and M. R. Rogers, Natural Gas Storage Monoliths Based on Activated Carbon Fibers, **In Proc. EUROCARBON 2000**, p. 133, July 2000

T. Oku, A. Kurumada, B. McEnaney, T. D. Burchell, M. Ishihara, K. Hayashi, S. Baba. Ion Irradiation Effect on Different Carbon Fibers, **In Proc. EUROCARBON 2000**, p. 947, July 2000

T. D. Burchell, Gas Separation Using a Carbon Fiber Composite Molecular Sieve, **In Proc 14th Annual Conf on Fossil Energy Materials**, Pub. Oak Ridge National Lab. (2000)

Tim Burchell and Mike Rogers, Low Pressure Storage of Natural Gas for Vehicular Applications, **SAE Paper 2000-01-2205**, Pub. Society of Automotive Engineers, Inc. (2000)

Tim Burchell, Rod Judkins, Alex Gabbard, Omats Omatete and Mike Rogers, Development of Novel Activated Carbon Composites, **In Proc 15th Annual Conf on Fossil Energy Materials**, Pub. Oak Ridge National Lab. (2001)

Resume of Timothy D. Burchell

E. L. Fuller, T. D. Burchell and M.R. Rogers, Energetics and Mechanism of Physical Sorption on Carbonaceous Solids: Grafoil Flexible Carbon, In **Proc. 25th Biennial Conf. On Carbon**, July 2001

Tim Burchell, Alex Gabbard, Jane Howe and Mike Rogers, Natural Gas Storage Monoliths Based on Carbon Fibers, In **Proc. 25th Biennial Conf. On Carbon**, July 2001

James Klett, Nidia Gallego, Tim Burchell, Jeff Bailey, Irradiation Studies of Graphite Foams and Effects on Properties for Use in a Solid State Self-regulating Nuclear Heat Source for Small Modular Power Units, In **Proc. 25th Biennial Conf. On Carbon**, July 2001

A. Kurumada, T. Oku, B. McEnaney, T.D. Burchell, M. Ishihara, K. Hayashi, S. Baba and J. Aihara, Ion Irradiation Effects on Mechanical Properties and Microstructures of Different Carbon Fibers, In **Proc. 25th Biennial Conf. On Carbon**, July 2001

T. D. Burchell, Nuclear Graphite and Radiation Effects, In. **Encyclopedia of Materials: Science and Technology**, Pub Elsevier Science Ltd. (2001)

T. D. Burchell, Radiation Effects in Carbon-Carbon Composites, In. **Encyclopedia of Materials: Science and Technology**, Pub Elsevier Science Ltd. (2001)

T. D. Burchell. Neutron Irradiation Damage in Graphite and its Effects on Properties. Paper No. H095. In **Proceedings of the International Carbon Conference CARBON 2002**, Beijing, China, September 2002.

T. D. Burchell. Carbon Fiber Composite Adsorbent Media for Low Pressure Natural Gas Storage. **Energia** Vol. 13, No. 3 (2002)

Timothy R. Armstrong, Lynn B. Klett, Dane F. Wilson, Timothy Burchell and Roddie R. Judkins. A Regenerable CO₂ Scrubber for Alkaline Fuel Cells, In **Proceedings US Fuel Cell Seminar**, Nov. 18-21, 2002, Palm Springs, CA.

Tim Burchell, Jane Howe, Alex Gabbard, and Mike Rogers. Adsorbent Carbon Fiber Composites for the Storage of Natural Gas, In. Proc. 48th International SAMPE Symposium, pp. 1855-1867, Pub. Society for the Advancement of Materials and Process Engineering (2003)

Nidia C Gallego, Timothy D. Burchell, James W. Klett. Neutron Irradiation Damage in Graphite Foam and its Effects on Properties, In Proc CARBON '03, July 2003, Oviedo, Spain. Pub. Spanish Carbon Group (2003)

L.L. Snead, T.D. Burchell, A.L. Qualls. Strength of Neutron Irradiated High-Quality 3D Carbon Fiber Composite. **J. Nucl. Mater.** **321 (2003) 165-169**.

T. D. Burchell, M Srinivasan and D. Naus. Codes and Standards Development For Graphite-Moderated Nuclear Reactors. In. Basic Studies in the Field of high temperature Engineering, Third International Exchange Meeting, Iberaki-ken, Japan, 11-12 September, 2003. pp 33-39, Pub. Nuclear Energy Agency, OECD (2004).

J. W. Klett, A. D. McMillan, N. C. Gallego, T. D. Burchell, C. A. Walls. Effects of heat treatment conditions on the thermal properties of mesophase pitch-derived graphitic foams. **CARBON 42 (2004) 1849-1852**

Resume of Timothy D. Burchell

N. C. Gallego and T. D. Burchell, Carbon Materials for Hydrogen Storage, ANS/ENS International Winter Meeting, New Orleans, LA, USA, Nov. 16-20, 2003.

N. C. Gallego, T. D. Burchell and A. M. Clark, Carbon Materials for Hydrogen Storage, In Proc CARBON 2004, An International Conference on Carbon, Providence Rhode Island, July 11-16, 2004. Pub. American Carbon Society

T. D. Burchell, O. Omatete, N. C. Gallego, and F. S. Baker, "Use of Carbon Fiber Composite Molecular Sieves for Air Separation," *Adsorption Science & Technology*, **23(3)**, pp. 175-194 (2005).

N. C. Gallego, T. D. Burchell, James W. Klett, Irradiation effects on graphite foam, **CARBON**, In Press (2005).

IX. BOOK CHAPTERS

T. D. Burchell. Radiation Damage in Carbon Materials. In **Physical Processes of the Interaction of Fusion Plasmas with Solids**. Wolfgang O. Hoffer and Joachim Roth, Editors. Academic Press Inc, pp.341-384, 1996.

T. D. Burchell and T. Oku. Materials Properties Data for Fusion Reactor Plasma Facing Carbon-Carbon Composites. IAEA Atomic and Plasma-Material Interaction Data for Fusion (Supplement to the Journal **Nuclear Fusion**), Vol. 5, pp. 77-128, Dec. 1994. Pub. International Atomic Energy Agency, Vienna, 1994.

T. D. Burchell. Fission Reactor Applications of Carbon. In **Carbon Materials for Advanced Technologies**, T. D. Burchell, Editor. Elsevier Science, Ltd. Oxford (1999).

T. D. Burchell. Porous Carbon Fiber-Carbon Binder Composites. In **Carbon Materials for Advanced Technologies**, T. D. Burchell, Editor. Elsevier Science, Ltd. Oxford (1999).

G.R. Romanoski and T. D. Burchell. Fracture in Graphite. In **Carbon Materials for Advanced Technologies**, T. D. Burchell, Editor. Elsevier Science, Ltd. Oxford (1999).

T. D. Burchell. Carbon Materials for Nuclear Energy Applications. In **Science of Carbon Materials**, Harry Marsh & Francisco Rodriguez Reinoso, Editors. Publicaciones Universidad de Alicante, Spain (2000)

T. D. Burchell. Thermal Properties and Nuclear Applications. In **Graphite and Precursors (World of Carbon, Vol. 1)**, Peirre Delhaes, Editor. Gordon & Breach Science Publishers (2001)

T. D. Burchell, Carbon Materials for Energy Production and Storage, In. **Design and Control of Structure of Advanced Carbon Materials for Enhanced Performance**, B. Rand et al (Eds). pp. 277-294, Pub. Kluwer Academic Publishers (2001).

X BOOKS

T. D. Burchell, Editor. Carbon Materials for Advanced Technologies. Elsevier Science, Ltd. Oxford (1999).

Resume of Timothy D. Burchell

XI. REPORTS

A. CEGB reports:

- TPRD/B/0791/R86 M. O. Tucker, A. P. G. Rose and T.D. Burchell. The Fracture of Polygranular Graphites.
- TPRD/B/0929/R87 A. J. Wickham, T. D. Burchell, P. J. C. Loney, B. Leach and E. A. T. Bowden. Assessment of the 1984 Graphite-Monitoring Data for Bradwell Reactor No. 2.
- TPRD/B/PC/0327/M87 A. J. Wickham and T. D. Burchell. Visit Report: 18th Biennial Conference on Carbon (Worcester, Massachusetts, 19-24 July 1987).
- TPRD/B/PC/0328/M87 T. D. Burchell. Visit Report: Oak Ridge National Laboratory, Tennessee, 28-29 July 1987 (including preliminary discussions on graphite creep held at 21st Carbon Conf Worcester Mass.)
- TPRD/B/0997/R87 T. D. Burchell, A. J. Wickham and N. L. Andrews. Irradiation-Induced Dimensional Changes of Pile Grade "A" Graphite in Magnox Reactors.
- TPRD/B/1027/R88 T. D. Burchell. The Treatment of Stored Energy and Thermal Conductivity in the RHASD "Reactor-Heating-After-Shut-Down" Fault Study Code.
- TPRD/B/1033/R88 T. D. Burchell, E. Oxley and K. E. Gilchrist. A Review of Stored Energy in PGA Graphite Irradiated in CEGB Magnox Reactors.

B. ORNL Reports:

- Letter Report T. D. Burchell. Letter Report on the Fracture Mechanics Testing of IG-110 Graphite. Milestone Report under US/Japan Agreement on HTGR Technology, Jan 15, 1990
- ORNL/NPR-90/18 T. D. Burchell. In "White Paper on Materials for New Production Reactors", compiled by G. M. Slaughter, Jan.22, 1990.
- Letter Report T. D. Burchell. Letter Report on an Improved Carbon-Carbon Architecture for the General Purpose Heat Source Graphite Impact Shell, transmitted to USDOE, Washington, Jan. 31, 1990.
- ORNL/NPR-90/14 T. D. Burchell. A Review of the Properties of Carbon Materials suitable for MHTGR High-Temperature Control Rods, June 1990.

Resume of Timothy D. Burchell

- ORNL/NPR-90/36 R. W. McClung, D. J. McGuire and T. D. Burchell. Nondestructive Testing for the MHTGR/NPR, Sept. 1990.
- ORNL/GCR-90/3 E. L. Fuller, Jr., O. C. Kopp, T. D. Burchell and A. D. Underwood. Microgravimetric Analysis of Corrosion of H-451 Graphite Coolant Impurities: Preliminary Report of Kinetics and Mechanisms, Sept. 1990.
- Letter Report T. D. Burchell, C. R. Luttrell and W. F. Jones. Letter Report on an Improved Carbon-Carbon Composite Graphite Impact Shell, transmitted to USDOE, Washington, Nov. 1990.
- ORNL/TM/12047 T. D. Burchell, W. P. Eatherly, G. B. Engle and G. W. Hollenberg. A Carbon-Carbon Composite Development Program For Fusion Energy Applications. July 1991. Oct. 92.
- ORNL/NPR-91/19 T.D. Burchell, J.P. Strizak, G. Nelson, D. Barker, and J. Bailey. Pre-irradiation Data Report for NPR-MHTGR Graphite, Irradiation Capsules HTN 1 and 2. Dec. 1991.
- ORNL/NPR-91/35 T. D. Burchell, JM Robbins, and J. P. Strizak. Assessment of Post Irradiation Examination Data from HFIR Capsule HTN-1. Dec. 1991.
- ORNL/NPR-92/6 T. D. Burchell and J. P. Strizak. Development of Carbon-Carbon Composite Materials for High-Temperature NP-MHTGR Control Rods. Feb. 1992.
- ORNL/NPR-92/32 T. D. Burchell. Graphite Peer Review Plan. Aug. 1992.
- ORNL/NPR-92/51 T. D. Burchell and JM Robbins. The Thermal Conductivity of NP-MHTGR Fuel Compacts. Sept. 1993.
- ORNL/NPR-92/54 T. D. Burchell. Interim Report on the Thermal Physical Properties of H-451 Graphite. April 1993.
- ORNL/NPR-93/7 T. D. Burchell, JM Robbins, and J. P. Strizak. Pre-Irradiation Data Report for NP-MHTGR Graphite Irradiation Capsule HTN-3. Oct. 1993.
- ORNL/NPR-93/10 T. D. Burchell and G. E. Nelson. The Thermal Physical Properties of H-451 Graphite. Sept. 1993.
- Letter Report T. D. Burchell. A Review of the Pressure Swing Adsorption Process for Gas Separation. June 1994.

Resume of Timothy D. Burchell

- Letter Report T. D. Burchell. Modeling the Tensile Failure Probabilities of High Temperature Engineering Test Reactor Graphites. Sept. 1994.
- Letter Report T. D. Burchell, W. P. Eatherly and C. E. Weaver. A Preliminary Assessment of Carbon Insulation Materials for the ANS Hot Source. August 1995.
- ORNL/TM-2001/70 R. D. Carneim, N. C. Gallego, T. D. Burchell and T. R. Armstrong. Desulfurization of Liquid Petroleum Fuels: A Review of Technologies Suitable for On-Board Desulfurization. 2001.
- ORNL/TM-2003/289 G.T. Mays, D.G. O'Conner, P.J. Otaduy, R.T. Primm III, N.C. Gallego, J.C. Conklin, F.C. Difilippo, J.W. Klett, T.D. Burchell, Solid State Reactor Final Report. December 2003
- ORNL/TM-2004/182 T. D. Burchell, O. O. Omatete, N. C. Gallego and F. S. Baker, A Preliminary Assessment of the use of Carbon Fiber Molecular Sieves for Air Separation. September 2004.
- ORNL/TM-2005/505 Timothy Burchell and Robert Bratton, Graphite Irradiation Creep Capsule AGC-1 Experimental Plan, May 2005.
- ORNL/TM-2005/509 Timothy Burchell and Robert Bratton, Physically Based Models of the Behavior of Nuclear Graphite under Neutron Irradiation, June 2005.
- ORNL/TM-2005/518 T. D. Burchell, L. L. Snead, A. M. Williams, J. L. Bailey, and J. P. Strizak, Initial Post Irradiation Examination Data Report for SGL NBG-10 Nuclear Grade Graphite, August 2005.
- ORNL-GEN4/LTR 05-003 Timothy Burchell, Status of ASTM Subcommittee D02.F Graphite Activities, July 2005
- ORNL-GEN4/LTR 05-013 Timothy Burchell, Dave Felde, and Ken Thoms, Experimental Plan and Preliminary Design Report for HFIR High Temperature Graphite Irradiation Capsules HTV-1 and -2. September 2005
- C. JAERI Reports:
- JAERI-memo 07-17 T. D. Burchell and T. Arai. Modeling the Tensile Fracture Probabilities of Nuclear Graphites with Widely Different Microstructures. JAERI Memo 07-017, February 1995, Pub. Japan Atomic Energy Research Institute.

Resume of Timothy D. Burchell

JAERI-Research 96-016 M. Eto, S. Ishiyama, T. D. Burchell and G. T. Yahr. The Biaxial Strength and Fracture Criteria for HTGR Graphites, JAERI Research Report 96-016. Pub. Japan Atomic Energy Research Institute, March 1996.