RAMACO RESEARCH RODEO

THE LEADING EDGE IN COAL-TO-PRODUCTS RESEARCH

July 11, 2018
July 12, 2018
A NEW FUTURE FOR COAL

What if coal was too valuable to burn? At Ramaco Carbon, we believe that recent developments in advanced materials and manufacturing technologies, combined with new research, will soon get us to this point. We see coal’s properties ultimately serving higher value purposes far beyond energy production.

Through the work that will be discussed this week, the possibilities are expanding for both the constructive and commercial uses of coal’s carbon and chemical properties. From that research, this resource will be properly regarded as an elemental building block for many things, some essential and some not even yet considered.

We welcome you to the Ramaco Research Rodeo, a forum to exchange ideas, foster collaborations, and help move the coal-to-products field forward. Thank you for joining us. We look forward to working together to transform how coal is not only used, but how it is perceived.

All the best,

Randall Atkins
CHAIRMAN AND CEO, RAMACO CARBON
# Schedule: July 11

## Opening
8:15 - 8:35 AM
- A Future for Coal
  - Randall Atkins, Ramaco Carbon

## Session One
8:35 - 10:15 AM
- Coal Composition in the Powder River Basin
  - Ken Woodring, Ramaco Carbon
- Understanding the Anatomy of Coal
  - Nicola Ferralis, MIT
- Enabling Production from Coal & Related Materials
  - Tom Tarka, NETL
- Fingerprinting Coal Tars & Pitches
  - Don Collins, WRI

## Break
10:15 - 10:30 AM

## Lunch
12:10 - 1:10 PM
- Materials and Manufacturing Revolution
  - Moe Khaleel, ORNL

## Session Two
10:30 - 12:10 PM
- New Approaches for Converting Coal into Carbon Products
  - Chris Matranga, NETL
- New Carbon Materials & Products R&D
  - Edgar Lara Curzio, ORNL
- 3D Thermoset Printing “ThermoBot”
  - Moe Khaleel, ORNL
- Life Sciences Technology Materials & Products
  - Garrett Lindemann, Ramaco Carbon

## Break
3:10 - 3:30 PM
- Coal Tar Pitch Processing Towards Mesophase-based Carbon Fiber
  - Matt Weisenberger, University of Kentucky
- Coal-Plastic Composites for Construction Applications
  - Jason Trembly, Ohio University
- Synthesis of High-Value Carbon Materials from Coal
  - Congjuin Wang, NETL

## Session Three
1:10 - 3:10 PM
- Carbon Fiber Manufacturing & Precursor Specification
  - Amit Naskar, ORNL
- Coal Tar Pitch Processing Towards Mesophase-based Carbon Fiber
  - Matt Weisenberger, University of Kentucky
- Coal-Plastic Composites for Construction Applications
  - Jason Trembly, Ohio University
- Synthesis of High-Value Carbon Materials from Coal
  - Congjuin Wang, NETL

## Break
3:10 - 3:30 PM
- Coal Tar Pitch Processing Towards Mesophase-based Carbon Fiber
  - Matt Weisenberger, University of Kentucky
- Coal-Plastic Composites for Construction Applications
  - Jason Trembly, Ohio University
- Synthesis of High-Value Carbon Materials from Coal
  - Congjuin Wang, NETL

## Session Four
3:30 - 5:10 PM
- Separation Membranes
  - Jeffrey Grossman, MIT
- Electronic Components
  - Nicola Ferralis, MIT
- Graphene Nanotechnology & Energy Harvesting
  - Sanjay K. Behura, University of Illinois at Chicago

## Hors d’Oeuvres
5:10 - 6 PM

## Adjourn to Rodeo
6 PM
### SCHEDULE: JULY 12

<table>
<thead>
<tr>
<th>SESSION FIVE</th>
<th>8 - 9:20AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Products - The Market Opportunities</td>
<td>Charlie Atkins, Ramaco Carbon</td>
</tr>
<tr>
<td>Techno-economic and Market Pricing for Carbon Products from Coal</td>
<td>Sujit Das, ORNL</td>
</tr>
<tr>
<td>Coal to Products from the U.S.A. to China and Back</td>
<td>Matthew Targett, Spruceworks</td>
</tr>
<tr>
<td><strong>BREAK</strong></td>
<td>9:20 - 9:30AM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SESSION SIX</th>
<th>9:30 - 11:10AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation-based Design of Fossil Energy Devices</td>
<td>Bill Rogers, NETL</td>
</tr>
<tr>
<td>Advanced Carbon Materials in 1/3 the Time</td>
<td>Nicola Ferralis, MIT</td>
</tr>
<tr>
<td>Property Prediction of Carbon Fiber Reinforced Composites</td>
<td>Ray Stuart Fertig III, University of Wyoming</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SESSION SEVEN</th>
<th>11:10 - 12:35PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Beneficiation Process Technologies</td>
<td>Tom Sarkus, NETL</td>
</tr>
<tr>
<td>Quality Carbon Feedstocks from Coal</td>
<td>Alan Bland/Don Collins, WRI</td>
</tr>
<tr>
<td>Extraction, Separation and Tailoring of Precursors</td>
<td>Amit Naskar, ORNL</td>
</tr>
<tr>
<td><strong>LUNCH</strong></td>
<td>12:35 - 1:35PM</td>
</tr>
<tr>
<td>Clean Coal Conversion Technology: A Successful Case Study</td>
<td>Richard Wolfe, Carbon Technology Co. / Virginia Carbonite</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SESSION EIGHT</th>
<th>1:35 - 3:45PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Novel Olefin Production Process</td>
<td>Amit Goyal, Southern Research</td>
</tr>
<tr>
<td>Chemicals and Resins from Coal</td>
<td>Vijay Sethi, WRI / Thermosolv</td>
</tr>
<tr>
<td>Coal Testing: Supercritical CO2 Pyrolysis</td>
<td>Joshua Walter, TerraPower</td>
</tr>
<tr>
<td>Coal-Derived Products</td>
<td>Pyoungchung Kim, TerraPower</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONCLUSION</th>
<th>3:45 - 4PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing Remarks</td>
<td>Randall Atkins, Ramaco Carbon</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOURS</th>
<th>4 - 6PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheridan County Museum</td>
<td></td>
</tr>
<tr>
<td>Black Diamond Trail through Former Mining Towns</td>
<td></td>
</tr>
<tr>
<td>Site of the iPark and iCam</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADJOURN TO RODEO</th>
<th>6PM</th>
</tr>
</thead>
</table>
SESSION ONE

UNDERSTANDING COAL

Understanding coal and its constituent compounds is a vital step in devising commercially viable process technologies, which will help produce precursor feedstocks for further processing into high-value carbon-based products.

This session will dive into the resource's composition and its potential.

Moderator: Tom Sarkus
NATIONAL ENERGY TECHNOLOGY LABORATORY

Tom Sarkus is the Senior Industrial Partnerships Manager at the U.S. Department of Energy’s National Energy Technology Laboratory. He has worked on DOE’s Clean Coal and Fossil Energy technology demonstration programs since their inception in the mid-1980s.

COAL COMPOSITION IN THE POWDER RIVER BASIN

Ken Woodring is a retired mining executive with over 40 years of experience in the major coal mining basins of the U.S. Major positions held include EVP Mining Operations at Arch Coal and President CEO of Trinity Coal Corp. He has a BS in Mining Engineering from Pennsylvania State University and is a graduate of the Advanced Management Program at Harvard Business School.

THE ANATOMY OF COAL

Nicola Ferralis is a Research Scientist in the Department of Materials Science and Engineering at MIT. He leads several experimental research projects in the development of novel materials and technologies for energy/water systems. A native of Italy, he holds a Bachelor’s and Master’s degree in Physics from the University of Padua and a PhD in Experimental Condensed Matter Physics with distinction from Penn State University.

ENABLING PRODUCTION FROM COAL & RELATED MATERIALS

Tom Tarka is currently employed at the U.S. Department of Energy’s National Energy Technology Laboratory in Pittsburgh, PA, and has been instrumental in the development of alternative transportation fuels from coal, natural gas and biomass. He has earned a Certificate in Public Leadership from the Brookings Institution, is a licensed engineer in the Commonwealth of Pennsylvania, and a member of the American Institute of Chemical Engineers (AIChE).

FINGERPRINTING COAL TARS AND PITCHES

Don Collins is the Chief Executive Officer of the Western Research Institute, developing NextGen fossil and bio energy and products technologies, including carbon fibers, coal beneficiation, and CO2 utilization. He also assists Wyoming to expand coal exports and advance CO2 utilization as part of the Wyoming Infrastructure Authority board. Prior to WRI, Don managed R&D in the Department of Energy into new technologies.
SESSION TWO

EMERGING CARBON MATERIALS AND PRODUCTS

Leading-edge researchers are inventing new ways to use coal to produce advanced materials — such as carbon nanotubes, foams, and fibers — at commercially viable prices.

This session will discuss the leading carbon materials and products that are ready for transition into commercial products.

Moderator: William Rogers
NATIONAL ENERGY TECHNOLOGY LABORATORY

Bill Rogers is a Registered Professional Engineer in West Virginia, and has worked at NETL for 33 years in various roles associated with energy R&D, with interests including computational fluid dynamics in combustion, gasification, fuel cells, and experimentation for CFD model validation.

CONVERTING COAL INTO CARBON PRODUCTS

Christopher Matranga is a staff scientist in the Materials Engineering and Manufacturing Division at the National Energy Technology Laboratory, with a focus on nanostructured materials. He earned his M.S. and Ph.D from the University of Chicago in Physical Chemistry, his B.S. from the University of Houston-Downtown in Industrial Chemistry and Applied Mathematics, and an M.B.A. from the University of Pittsburgh.

NEW CARBON MATERIALS AND PRODUCTS R&D

Edgar Lara Curzio leads the Mechanical Properties & Mechanics Group in the Materials Science & Technology Division at the Oak Ridge National Laboratory, focused on the development and characterization of functional and structural materials. Lara-Curzio received a degree in Engineering Physics from the Metropolitan University in Mexico City, and a Ph.D. in Materials Engineering from Rensselaer Polytechnic Institute in Troy, NY.

3D THERMOSET PRINTING “THERMOBOT”

Moe Khaleel is the Associate Laboratory Director for Energy and Environmental Sciences at Oak Ridge National Laboratory, leading a $260M research portfolio focused on the most critical problems facing society at the nexus of energy, environment, and security. He received his doctorate in structural mechanics from Washington State University and an MBA from the Foster School of Business at the University of Washington.

LIFE SCIENCES TECHNOLOGY MATERIALS/PRODUCTS

Garrett Lindemann is the Assistant Director of Business Development and Life Science Specialist for RAMACO Carbon. He has previously held positions with the Chief Technology Office of Roche Diagnostics, Industrial Farmaceutical Cantabria, and 3DHistech, as well as several start-ups. He earned his undergraduate degrees in Chemistry & Biology from Saint John’s University, and a Ph.D. in Molecular Genetics from the University of Kansas.
MARKETABLE CARBON PRODUCTS AND MANUFACTURING TECHNOLOGIES PT. 1

Decades of research on advanced materials such as carbon fiber has led to refinements in both those materials and their production methods for commercialization.

This session addresses the question: “What are the preferred precursor feedstock specifications required to achieve cost-effective manufacturing of advanced carbon materials?”

Moderator: Chris Matranga

Christopher Matranga is a staff scientist in the Materials Engineering and Manufacturing Division at the National Energy Technology Laboratory, with a focus on nanostructured materials.

CARBON FIBER MANUFACTURING AND PRECURSOR SPECIFICATION

Amit K. Naskar is a senior research staff member and leader of the Carbon and Composites Group in the Oak Ridge National Laboratory’s Materials Science & Technology Division. His areas of research include carbon fibers, alternative carbon precursors, sustainable polymeric materials, and composites. Dr. Naskar, a native of India, earned his Ph.D. in Rubber Technology from the Indian Institute of Technology in Kharagpur, India.

COAL TAR PITCH PROCESSING FOR CARBON FIBER

Matt Weisenberger is Principal Research Engineer for the Center for Applied Energy Research at the University of Kentucky. His research interests include structure-properties-processing relationships for carbon fibers, and nano composites. He has a BS in Chemistry from Georgetown University, and earned both a Masters and PhD in Materials Science and Engineering from University of Kentucky.

COAL-PLASTIC COMPOSITES FOR CONSTRUCTION APPLICATIONS

Jason Trembly is Director of the Russ College’s Institute for Sustainable Energy and the Environment at Ohio University. His research focuses on process intensification to increase sustainability in the energy and environmental spaces. Research areas of interest include coal utilization, syngas conversion, natural gas/NGLs conversion, nutrient recovery, high temperature electrochemical systems, and techno-economic studies.

SYNTHESIS OF CARBON MATERIALS FROM COAL

Congjun Wang is a Chief Materials Scientist for AECOM, and a contractor for NETL. His research interests focus on the synthesis of a wide variety of nanomaterials such as carbon nanotubes, graphene quantum dots, semiconductor quantum dots, and metal and metal oxide nanocrystals. Wang received his PhD in chemistry from the University of Chicago, and BS from Nanjing University in China.
MARKETABLE CARBON PRODUCTS AND MANUFACTURING TECHNOLOGIES PT. 2

Decades of research on advanced materials such as carbon fiber has led to refinements in both those materials and their production methods for commercialization.

This session addresses the question: "What are the preferred precursor feedstock specifications required to achieve cost-effective manufacturing of advanced carbon materials?"

Moderator: Charlie Atkins

Charlie Atkins is the Director of Development for the Wyoming Industrial Innovation and Invention Park, or iPark, which is being developed with Ramaco Carbon outside Sheridan, WY.

SESSION FOUR

Jeffrey Grossman
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Jeffrey C. Grossman is the Morton and Claire Goulder and Family Professor in Environmental Systems and a Professor in the Department of Materials Science and Engineering at the Massachusetts Institute of Technology. He received his Ph.D. in theoretical physics from the University of Illinois, performed postdoctoral work at U.C. Berkeley, and was a Lawrence Fellow at the Lawrence Livermore National Laboratory.

Nicola Ferralis
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Nicola Ferralis is a Research Scientist in the Department of Materials Science and Engineering at MIT. He leads several experimental research projects in the development of novel materials and technologies for energy/water systems. A native of Italy, he holds a Bachelor’s and Master’s degree in Physics from the University of Padua and a PhD in Experimental Condensed Matter Physics with distinction from Penn State University.

Sanjay Behura
UNIVERSITY OF ILLINOIS, CHICAGO

Sanjay Behura is a Research Assistant Professor in Chemical Engineering at The University of Illinois at Chicago. He is strongly focused on the development of low-dimensional materials and nano-architectures, nano-optoelectronic phenomena in complex heterostructure circuits, and emerging photovoltaic science in mixed-dimensional surface-junctions.
COAL-TO-PRODUCTS MARKETS

Assessment of the market potential for advanced carbon products is essential to setting performance and cost goals for associated manufacturing technologies.

This session will focus on the latest assessments of potential market size, values and growth rates for carbon products made from coal.

Moderator: Michael Nowak

NATIONAL ENERGY TECHNOLOGY LABORATORY

Michael Nowak is the University & National Lab Partnerships Manager at the NETL, where he has worked for over 32 years, in capacities including hands-on laboratory research, technology transfer, and education outreach.

CARBON PRODUCTS: THE MARKET OPPORTUNITIES

Charlie Atkins is the Director of Development for the Wyoming Industrial Innovation and Invention Park, or iPark, which is being developed with Ramaco Carbon on a 15,000 acres mineral resource just outside Sheridan, WY. He is a former Morehead Scholar, Marshall Scholar as well as a Visiting Fellow at the Brookings Institution.

TECHNO-ECONOMIC AND MARKET PRICING FOR CARBON PRODUCTS

Sujit Das is part of the Senior Research Staff at Oak Ridge National Laboratory, where he’s worked for more than 30 years, and led several projects in the areas of resource modeling, energy/economic and policy analysis of numerous resource markets including petroleum, coal, and alternative fuels. He earned a MS and MBA from the University of Tennessee, and a Bachelor of Technology from the Indian Institute of Technology in Kharagpur.

COAL TO PRODUCTS FROM THE U.S.A. TO CHINA AND BACK

Matthew Targett is the former leader of global R&D initiatives for LP Amina, a multinational environmental engineering company, and former head of Innovation Management for Bayer Technology Services in Asia. He recently joined a new firm named Spruceworks LLC. He has a BS in chemical engineering from Pennsylvania State University and a MS and PhD in chemical engineering from the University of Pennsylvania.
MODELING & SIMULATION TOOLS FOR FASTER COMMERCIALIZATION

The exponential growth in computing power, as well as its increasing affordability, has quickened development of advanced carbon materials and production processes.

This session will highlight exciting developments in computer modeling and simulations, and provide insights on how new computer tools can move research toward commercialization more quickly.

Moderator: Chris Matranga

Christopher Matranga is a staff scientist in the Materials Engineering and Manufacturing Division at the National Energy Technology Laboratory, with a focus on nanostructured materials.

SIMULATION-BASED DESIGN OF FOSSIL ENERGY DEVICES

Bill Rogers is a Registered Professional Engineer in West Virginia, and has worked at NETL for 33 years in various roles associated with energy R&D. His research interests include computational fluid dynamics in combustion, gasification, chemical looping, fuel cells, and experimentation for CFD model validation. He has a PhD in Mechanical Engineering and an MBA from West Virginia University.

ADVANCED CARBON MATERIALS IN ONE-THIRD THE TIME

Nicola Ferralis is a Research Scientist in the Department of Materials Science and Engineering at MIT. He leads several experimental research projects in the development of novel materials and technologies for energy/water systems. A native of Italy, he holds a Bachelor’s and Master’s degree in Physics from the University of Padua and a PhD in Experimental Condensed Matter Physics with distinction from Penn State University.

PROPERTY PREDICTION OF CARBON FIBER REINFORCED COMPOSITES

Ray Stuart Fertig III is an associate professor at the University of Wisconsin, and a computational materials scientist with a background in theoretical and applied mechanics. He earned his MS from the University of Wyoming, and a PhD in Materials Science from Cornell University, where he focused on using massively parallel dislocation dynamics simulations to statistically link plastic deformation with dislocation mechanics.
SESSION SEVEN

COAL PREPARATION FOR PRECURSOR PRODUCTION PT. 1

Over the past several decades, many processes related to coal upgrading, beneficiation and conversion have been developed, with many lessons learned.

Speakers in this session will discuss recent developments in coal preparation and precursor production process methods, as well as technologies focused on making products from coal.

Moderator: Jason Trembly

Ohio University

Jason Trembly is Director of the Russ College’s Institute for Sustainable Energy and the Environment at Ohio University. His research focuses on process intensification to increase sustainability in the energy and environmental spaces.

COAL BENEFICIATION PROCESS TECHNOLOGIES

Tom Sarkus is the Senior Industrial Partnerships Manager at the U.S. Department of Energy’s National Energy Technology Laboratory. He has worked on DOE’s Clean Coal and Fossil Energy technology demonstration programs since their inception in the mid-1980s. He holds degrees in chemistry, geology, earth science, and law.

QUALITY CARBON FEEDSTOCKS FROM COAL

Don Collins is the Chief Executive Officer of the Western Research Institute, developing NextGen fossil and bio energy and products technologies, including carbon fibers, coal beneficiation, and CO2 utilization. He also assists Wyoming to expand coal exports and advance CO2 utilization as part of the Wyoming Infrastructure Authority board. Prior to WRI, Don managed R&D in the Department of Energy into new technologies.

EXTRACTION, SEPARATION AND TAILORING OF PRECURSORS

Amit K. Naskar is a senior research staff member and leader of the Carbon and Composites Group in the Oak Ridge National Laboratory’s Materials Science & Technology Division. His areas of research include carbon fibers, alternative carbon precursors, sustainable polymeric materials, and composites. Dr. Naskar, a native of India, earned his Ph.D. in Rubber Technology from the Indian Institute of Technology in Kharagpur, India.
COAL PREPARATION FOR PRECURSOR PRODUCTION PT. 2

Over the past several decades, many processes related to coal upgrading, beneficiation and conversion have been developed, with many lessons learned.

Speakers in this session will discuss recent developments in coal preparation and precursor production process methods, as well as technologies focused on making products from coal.

Moderator: Tom Sarkus
NATIONAL ENERGY TECHNOLOGY LABORATORY

Tom Sarkus is the Senior Industrial Partnerships Manager at the U.S. Department of Energy’s National Energy Technology Laboratory. He has worked on DOE’s Clean Coal and Fossil Energy technology demonstration programs since their inception in the mid-1980s.

A NOVEL OLEFIN PRODUCTION PROCESS UTILIZING CO2

Amit Goyal is associate director of the Southern Research Sustainable Chemistry and Catalysis group, Energy & Environment, North Carolina, where he is responsible for managing research initiatives and commercial business development in areas of sustainable chemistry, catalyst and process development. Goyal received a Master of Science and doctorate in chemical engineering from New Jersey Institute of Technology.

CHEMICALS AND RESINS FROM COAL

Vijay Sethi is the Senior Vice President for Energy Production and Generation business unit at Western Research Institute in Laramie, WY. He is also the Chief Executive Officer of Thermosolv LLC, a for profit spin-off from Western Research Institute. He has over 40 years of R&D experience in energy systems. He received his Ph.D. and MS from Case Western Reserve University, and an MS in Physics from Indian Institute of Technology, Delhi.

COAL TESTING: SUPERCRITICAL CO2 PYROLYSIS

Joshua Walter works within the Innovation Group at TerraPower LLC and is the lead for the development of nuclear non-electric applications and nuclear hybrid energy systems. Walter earned his doctoral degree in nuclear engineering from Purdue University, where he performed research related to hydrogen generation technology, fuel cells and nuclear system thermal-hydraulics.

COAL DERIVED PRODUCTS

PyoungChung Kim is an Analytical Chemist at TerraPower LLC, and was formerly a research scientist in the Center for Renewable Carbon at the University of Tennessee. His research interests include thermochemical conversion and solvent fractionation of coal. He has a PhD in Civil engineering from the University of Tennessee, and a MS and BS in Environmental Engineering from KonKuK University in South Korea.
WELCOME TO THE AMERICAN WEST

A range of world-class recreational opportunities await you in the Sheridan area. As a region that celebrates its frontier past while embracing a cutting edge future and the great outdoors, we invite you to take some time to enjoy the culture and beauty of Wyoming.

HIKING, BIKING, AND FISHING

The great outdoors don’t get much better than Wyoming. In addition to great hikes all around, fishing guides are available from the Fly Shop of the Bighorns, and bike rentals can be made found at Sheridan Bicycle.

LAND OF NATIONAL PARKS


SHOPPING AND DINING

Historic downtown Sheridan and the surrounding area have a range of shops and restaurants. We recommend King’s Saddlery for your Western decor, Frackleton’s for dinner, and the Mint Bar for a cold beverage.

SHERIDAN WYO RODEO

The local rodeo dates back almost a century, and is a time of great celebration here. Beyond the bucking broncos and horse races, there is also a carnival, a Native American Pow Wow and dance, and a grand Friday parade.
A FIRST-OF-A-KIND PROJECT

Here in Sheridan, Wyoming, we are building what we believe is the first vertically intergrated coal resource, research and mine-mouth manufacturing platform in the world. The Coal to Products Platform will offer occupants a unique ability to perform and commercialize their research.

Together these components provide the infrastructure to mine coal, research its potential to be developed into carbon based commercial products, and to manufacture such products in mine mouth facilities contiguous to the coal resource.
INNOVATING COAL.

CHARLES ATKINS - RAMACO CARBON
DON COLLINS - WESTERN RESEARCH INSTITUTE
EDGAR LARA-CURZIO - OAK RIDGE NATIONAL LABORATORY
CHRIS MATRANGA - NATIONAL ENERGY TECHNOLOGY LABORATORY
JEFFREY GROSSMAN & NICOLA FERRALIS - MASSACHUSETTS INSTITUTE OF TECHNOLOGY

WWW.RAMACOCARBON.COM