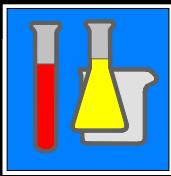




THE SOCIETY FOR ORGANIC PETROLOGY



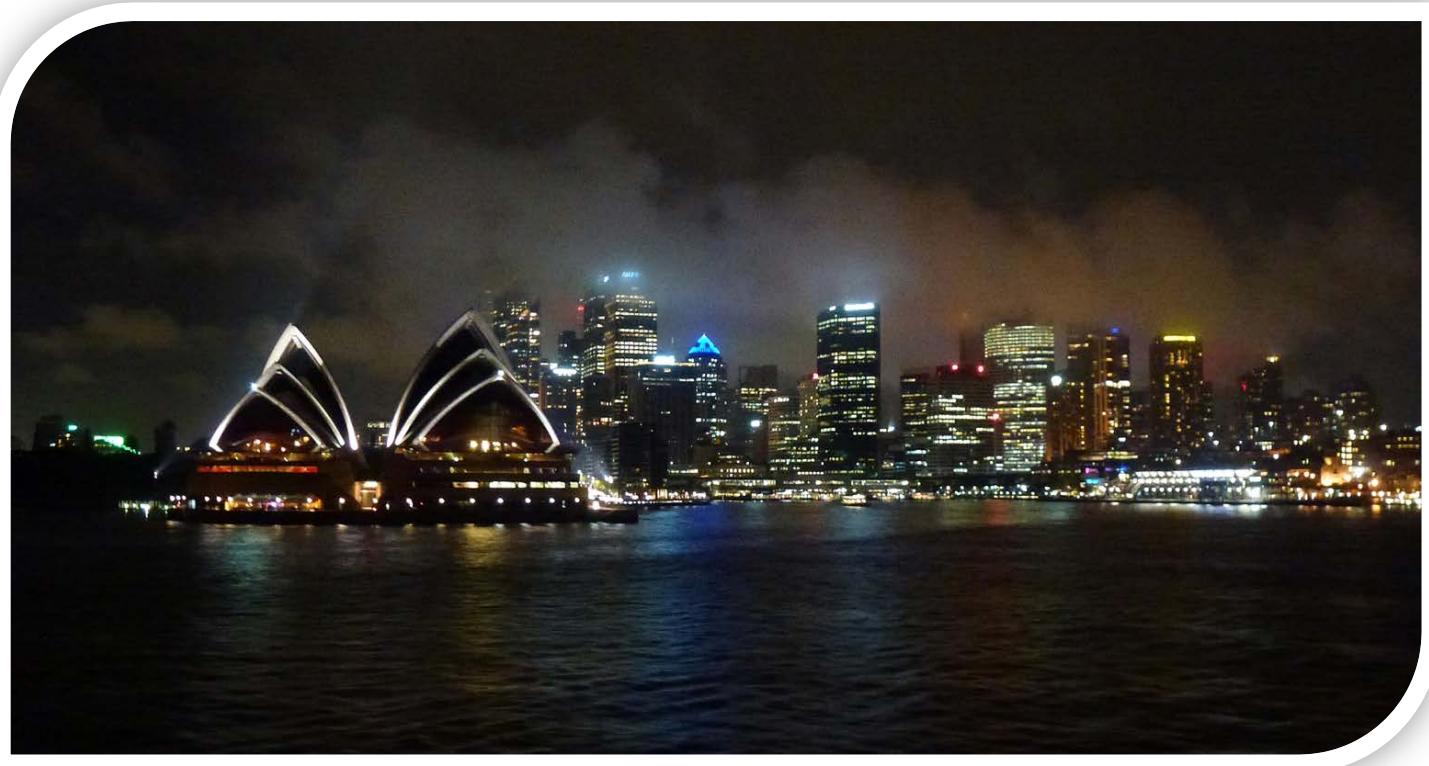
# NEWSLETTER

Vol. 31, No. 3

September, 2014

ISSN 0743-3816

## 31<sup>st</sup> TSOP Annual Meeting Sydney, Australia



Sydney as it can be seen from the Conference Dinner Cruise.  
Photo courtesy of Colin Ward

**September 27<sup>th</sup> to October 3<sup>rd</sup>, 2014**

## TSOP 31<sup>st</sup> Annual Meeting

September 27<sup>th</sup> – October 3<sup>rd</sup>, 2014

### Registration still available!

We are pleased to announce that arrangements are well underway for the 31<sup>st</sup> Annual Meeting of the Society for Organic Petrology which will take place in Sydney, Australia, from 27<sup>th</sup> September to 3<sup>rd</sup> October 2014.

The meeting provides an opportunity to showcase international research on different aspects of organic petrology and related fields in a relaxed and welcoming atmosphere.

Details for the meeting can be found on our website at <http://wp.csiro.au/tsop2014>. Registration forms can now be submitted. Feel free to advertise this event widely and don't hesitate to contact us if you have any questions.

We look forward to welcoming you to Sydney!

Kind regards,  
TSOP 2014 Organising Committee



### The Society for Organic Petrology

TSOP is a society for scientists and engineers involved with coal petrology, kerogen petrology, organic geochemistry and related disciplines. The Society organizes an annual technical meeting and field trips; sponsors research projects; provides funding for graduate students; and publishes a web site, a quarterly Newsletter, membership directory, annual meeting program and abstracts, and special publications. Members may elect not to receive the printed Newsletter by marking their dues forms or by contacting the Editor. Members are eligible for discounted subscriptions to the Elsevier journals *International Journal of Coal Geology* and *Review of Palaeobotany and Palynology*. Subscribe by checking the box on your dues form, or using the form at [www.tsop.org](http://www.tsop.org). Contact Paul Hackley [phackley@usgs.gov](mailto:phackley@usgs.gov) if you do not receive a bill or have any other problems with a subscription. For the best prices on subscriptions to AGI's *Geotimes*, see their web site at [www.geotimes.org/current](http://www.geotimes.org/current)

TSOP is a Member Society of AGI and an AAPG Associated Society

## The Society for Organic Petrology Newsletter

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### **GUIDELINES:**

The TSOP Newsletter welcomes contributions from members and non-members alike. Readers are invited to submit items pertinent to TSOP members' fields of study. These might include meeting reports and reviews, book reviews, short technical contributions including those on geologic localities or laboratory methods, as well as creative works such as poems, cartoons and works of fiction. Photos, graphs and other illustrations are welcomed. Low-resolution images are discouraged, as they cannot be reproduced well in print. Articles are preferred in Microsoft Word, RTF or plain text formats.

### **Contact the Editor:**

Rachel Walker  
 225 S. East St, Suite 144  
 Indianapolis, Indiana, 46202, USA  
 e-mail: [drachelwalker@gmail.com](mailto:drachelwalker@gmail.com)

### **Address Changes**

Please report any changes in address or contact information to: Paul Hackley, TSOP Membership Chair, [phackley@usgs.gov](mailto:phackley@usgs.gov)

Members can update their own information by logging into the secure TSOP website:

[www.tsop.org/mbrsonly/](http://www.tsop.org/mbrsonly/)

The TSOP Newsletter is published quarterly by The Society for Organic Petrology and is distributed to all Society members as a benefit of membership. Membership in the Society is open to all individuals involved in the fields of organic petrology and organic geochemistry. For more information on membership and Society activities, please see:

[www.tsop.org](http://www.tsop.org)

For purposes of registration of the TSOP Newsletter, a permanent address is:

The Society for Organic Petrology,  
 c/o American Geological Institute,  
 4220 King St., Alexandria,  
 VA 22302-1520 USA

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### **Newsletter Submission Deadlines**

December Issue: December 5<sup>th</sup>, 2014  
 March Issue: March 5<sup>th</sup>, 2015  
 June Issue: June 5<sup>th</sup>, 2015  
 September Issue: September 5<sup>th</sup>, 2015

## TSOP DUES

Due to the increasing cost of postage related to the black and white printed version of the newsletter, TSOP Council recently voted to increase the cost of membership with the printed newsletter to \$35 per year. The membership dues for the e-newsletter will remain at \$25 per year.

We encourage members to use our convenient online dues payment system. You can use it to pay by check/cheque (US Members), money order, wire or credit card. Login at [www.tsop.org/mbrsonly](http://www.tsop.org/mbrsonly) and select 'Online dues payment' or go to [www.tsop.org/dues](http://www.tsop.org/dues).

A copy of this year's dues form can be downloaded from the website by following the 'Dues' link from the main page ([www.tsop.org](http://www.tsop.org)).

Thank you for your interest and support of TSOP and we look forward to a renewal of your TSOP membership.



## Institutional/Corporate Memberships



We'd like to make members aware that membership in TSOP is also open to any organization having an active scientific interest in organic petrology or related fields. TSOP especially encourages institutions to join at the special **institutional rate of \$75/yr** (with e-newsletter or \$85/yr with printed newsletter) and help support the goals of the Society. See the website for details:

<http://www.tsop.org/join.htm>

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## Prof. Boris Alpern

In August, ICCP President Petra David informed TSOP Council that Prof. Boris Alpern passed away on 6 August 2014 at the age of 93. Boris was a founding member of ICCP and ICCP President from 1983 to 1987. For many years he significantly contributed to the work of organic petrology and was intensively involved in ICCP matters. He will be sorely missed.

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## TSOP Spackman Awards 2014

A total of four graduate students from three different continents have been successful in applications for funding under the Spackman Research Grants scheme for 2014. The successful students and their projects are as follows:

- **Carl Peters**, PhD student at Macquarie University, Sydney, Australia, for a project entitled: "Biomarkers and fluid inclusions of early Earth using samples from Australia"
- **Sophia Bratenkov**, PhD student at Macquarie University, Sydney, Australia, for a project entitled: "Exploration of Miocene biomarkers in cored sedimentary rocks from IODP Expedition 317, Canterbury Basin, New Zealand"
- **Arka Rudra**, PhD student at the Indian Institute of Technology, Bombay, India, for a project entitled: "Palaeo-environmental and palaeoclimatic studies of Palaeogene sediments and oils, Upper Assam Shelf, India"
- **Julian Zapata**, MEng student at the National University of Colombia, Medellin, Colombia, for a project entitled: "Petrographic and geochemical evaluation of core samples in horizontal drilling from Amagá Formation coals, to identify lateral variation of organic matter and content of the hydrocarbons present"

Outlines of these projects will be given in a future issue of the TSOP Newsletter.

As well as extending congratulations to the successful students the Research Committee would like to thank all of the students who applied for support from a Spackman Research Grant. Those who were unsuccessful are encouraged to apply again, and also to take up the offer of one year's free Student Membership that is available to all Spackman applicants.

We look forward to seeing as many of the applicants as possible at the TSOP Sydney meeting.

Colin R. Ward  
Chair, TSOP Research Committee

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## News from ASTM

ASTM subcommittee D05.28 Petrography of Coal and Coke met May 5, 2014, at the Toronto Sheraton Centre during ASTM Committee Week. Attending were Chair Paul Hackley (U.S. Geological Survey), Acting Secretary Doug Lowenhaupt and Adam Goodell (CONSOL Energy, Inc.), Michael Carmon (Hampton Roads Testing Labs), Scott Orthey (ASTM International), Tommy Pike (ABC Coke), Dave Spong, Lesley Taggart, and Eugene Simpkins (Arcelor Mittal Dofasco), Larry Runner (Arch Coal), and Ron Graham (SGS Mineral Services, Inc.). Discussion included updates to D7708 *Standard test method for microscopical determination of the reflectance of vitrinite dispersed in sedimentary rocks*.

Four ballots for D7708 recently passed ASTM D05 Main Committee, including a precision statement, a reporting template, a statement that non-compliant values can be used in a qualitative sense, and slight revisions to sample preparation rating. The updates will appear in the 2014 version of the standard.

Discussion of D5061 *Standard test method for microscopical determination of the textural components of metallurgical coke* included addressing the long-standing need for a precision statement. However, since very few laboratories in North America run this test, reproducibility limits will not be included and values from previous replicate analyses will be used to calculate a repeatability limit. The precision statement will be balloted at the subcommittee level later in 2014.

D3997 *Practice for preparing coke samples for microscopical analysis by reflected light* is being updated by Rich and Dave Pearson (Pearson Coal Petrography), who are also working on a new *Standard test method for microscopical determination of the reflectance of metallurgical*

coke. Both standards are in draft form and should be ready to ballot later this year or early in 2015.

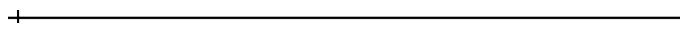
Nikola Van de Wetering (Univ. of Calgary) is working on updates to D5671 *Practice for polishing and etching coal samples for microscopical analysis by reflected light*, including addition of etched/un-etched photograph comparisons. D5671 also should be ready for ballot later this year or in early 2015.

Persons who are interested in learning more about the activities of ASTM subcommittee D05.28 Petrography of Coal and Coke are encouraged to contact Paul Hackley: [phackley@usgs.gov](mailto:phackley@usgs.gov).

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celebrate the theme "Earth's Connected Systems."

Go to the following website for more information:  
<http://www.earthsciweek.org/>



## Mystery of Underground Coal Fires

"Scientists say there are at least 30 underground coal fires in Eastern Kentucky, mostly in old abandoned mines. One of these burns under Highway 80 in Perry County. It's known as the Ruth Mullins fire and scientists are concerned that most people don't know how dangerous these fires can be."

Dr Jim Hower and Dr Jen O'Keefe feature in this news article on underground coal fires. To see the entire story and video, follow this link:

[www.lex18.com/news/lex-18-mystery-monday-mystery-of-underground-coal-fires/](http://www.lex18.com/news/lex-18-mystery-monday-mystery-of-underground-coal-fires/)

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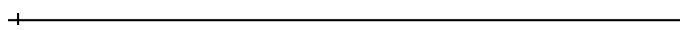
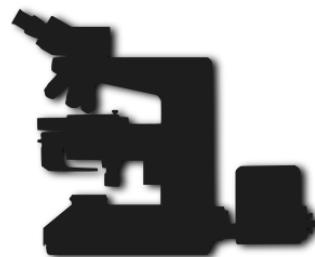


## USGS Energy Resources Program Photomicrograph Atlas

The United States Geological Survey (USGS) have a photomicrograph atlas available to the public at the following web address:

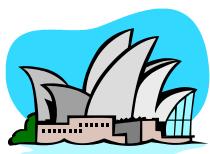
<http://energy.usgs.gov/Coal/OrganicPetrology/PhotomicrographAtlas.aspx>

This atlas contains images of organic material in shales, coal macerals, blue light/white light comparison images and more.



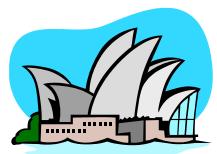
## Earth Science Week October 12-18

American Geosciences Institute (AGI) is once again celebrating Earth Science Week from October 12-18<sup>th</sup>. Since October 1998, the AGI has organized this national and international event to help the public gain a better understanding and appreciation for the Earth Sciences and to encourage stewardship of the Earth. This year's Earth Science Week will



## 31st Annual TSOP Meeting

Sydney, Australia



**September 27 – October 3, 2014**

It is now only a matter of weeks to the 31st Annual Meeting of the Society, which will be held in Sydney, Australia, from September 27 to October 3, 2014. If you haven't already done so, this is the last chance to register for this, the central event on the TSOP 2014 calendar.

The meeting will be held at the Rydges World Square Hotel, in the heart of Sydney's entertainment precinct. The hotel is located close to restaurants, theatres, museums and other attractions, including Darling Harbour and Chinatown. A wide range of other accommodation options is also available nearby.

A total of more than 70 papers have been accepted for presentation at the meeting, either in oral or poster form. These cover a range of themes, including:

- Advances in organic petrology and organic geochemistry
- Petrology and geochemistry of hydrocarbon source rocks
- Coal characterisation for resources and utilisation
- Geology of unconventional gas deposits
- Microbiology of natural organic materials

The papers accepted for oral or poster presentation are listed elsewhere in this Newsletter, and are also available from the meeting web site.

The technical program should be of interest to people from all areas of organic petrology and organic geochemistry, including researchers and practitioners in both the coal and petroleum industries as well as those with more academic interests in natural organic matter. Participation by students is especially encouraged.

The full meeting program includes:

- **Saturday, September 27:** Short course on "Application of Organic Petrology", presented by Claus Diessel and Walter Pickel.
- **Sunday, September 28:** Pre-meeting field trip covering coal and coal seam gas geology in the Southern Coalfield of the Sydney Basin. As well magnificent coastal scenery, this trip will allow participants to visit a coal seam gas extraction plant, examine outcrops of Late Permian coal seams and associated strata, and travel over the spectacular engineering structure of the Sea Cliff Bridge.
- **Monday, September 29:** Short course on "Digital Core Analysis - Theory and Applications for Unconventional Reservoir Assessment", presented by Alexandra Golab (Lithicon) and Andrew Fogden (ANU). This will focus on three-dimensional X-ray micro-CT imaging of coal, shale and organic-rich rocks, and its integration with other systems to evaluate features such as porosity and fracture networks.
- **Tuesday, September 30 and Wednesday, October 1:** Technical sessions, along with the traditional TSOP Business Lunch and the Conference Dinner.

- **Thursday, October 2 and Friday, October 3:** Field trip covering the Early Permian strata of the Hunter Coalfield, in the northern Sydney Basin, including a visit to an open-cut coal mine, inspection of a coal seam gas analysis laboratory, and a visit to one of the world-renowned wineries in the region.

Sydney has a number of attractions apart from the meeting to make the trip worthwhile. A special Partners' Program is also included, with visits to the Royal Botanic Gardens, the Sydney Opera House, and a cruise across Sydney Harbour to the beach-side area of Manly, as a further encouragement for spouses and family groups.

**Further information and registration forms** are available from the meeting website at <http://wp.csiro.au/tsop2014/> or through the TSOP website at <http://www.tsop.org>.

Alternatively, contact:

- Kaydy Pinetown – [kaydy.pinetown@csiro.au](mailto:kaydy.pinetown@csiro.au)
- Colin Ward – [c.ward@unsw.edu.au](mailto:c.ward@unsw.edu.au)

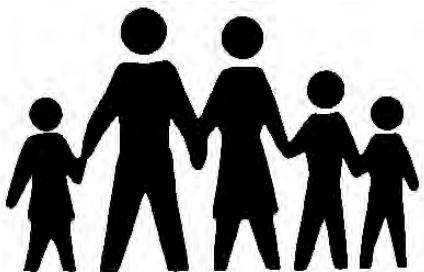


### Sydney Meeting Partners' Program

The TSOP Meeting in Sydney includes a Partners' Program, enabling family members accompanying the participants to visit some of the sights of Sydney while the technical sessions are in progress. A provisional program of visits is listed on the meeting web site. However, in the spirit of democracy this can be amended if necessary to better meet the interests of the partners concerned.

The meeting venue is conveniently located with respect to most of Sydney's attractions, and the Partners' Program organisers are happy to discuss options with prospective participants. Partners should make contact with Kathie Ward or Janet Chipling at the registration desk or during the Welcome Reception on September 29<sup>th</sup>. Alternatively, contact Kathie by e-mail ahead of the meeting at: [kathieward@optusnet.com.au](mailto:kathieward@optusnet.com.au)

Kathie and Janet look forward to seeing you in Sydney.



## TSOP 2014 - ORGANIC MATTER DOWN UNDER II List of Papers

Over 70 papers have been accepted for oral or poster presentation at the 2014 TSOP meeting in Sydney. The full list, grouped under the main themes of the conference, is given below.

### **Coal formation & characterisation**

*Evaluating the behaviour of mineral matter during coal combustion* by R.A. Creelman, C.R. Ward and D. French

*A new method for obtaining detailed chemical and mineral information on individual coal particles at the size that they are used in coke making* by P. Hapugoda, G. O'Brien, G. Krahenbuhl and K. Warren

*Palaeo-environmental conditions during the deposition of the Upper Juandah Coal Measures, Surat Basin, Queensland* by A. Hentschel, J. Esterle and S. Golding

*Quantitative inorganic profiling of coal seams using core-scanning x-ray fluorescence and radiographic techniques* by S. Kelloway, C. Ward, C. Marjo, I. Wainwright and D. Cohen

*Reconstruction of the late Paleocene- Eocene vegetation of western India: evidences from organic geochemistry and palynology* by S. Paul, J. Sharma, P.K. Saraswati and S. Dutta

*Electrofacies analysis for coal lithotype profiling based on high-resolution wireline log data* by A. Roslin and J. Esterle

*Petrological and geochemical characteristics of high organic sulphur coals from south and north China* by Y. Tang and Q. Zhao

*Petrographic characteristics of coal from the Balikpapan formation in the Samarinda area, lower Kutai basin, Indonesia* by C. Thuzar Win, D. Hendra Amijaya, S. Sapto Surjono, S. Husein and K. Watanabe

*Geochemistry of selenium-rich black shale of Permian age from Enshi, Hubei Province, China* by X. Wang, S. Dai, Y. Tang, Y. Jiang and L. Zhao

*Spatial variation in character and composition of the Fort Cooper Coal Measures in Bowen Basin* by S.A. Ayaz, J. Esterle, S. Rodrigues and M. Martin

*Elemental and mineralogical anomalies in coals from the Lincang Ge ore deposit, Yunnan, China: key role of N<sub>2</sub>-CO<sub>2</sub>-mixed hydrothermal solutions* by S. Dai, P. Wang, C.R. Ward, Y. Tang, X. Song, J. Jiang, J.C. Hower, T. Li, V.V. Seredin, N.J. Wagner, X. Wang and X. Li

*Utilization of K-zeolite synthesized from Chinese coal fly ashes for slow release K-fertilizer* by J. Li, X. Zhuang, O. Font, N. Moreno, V. Ramon Vallejo and X. Querol

*Sulfur and nitrogen in the high-sulfur coals of Late Paleozoic from China* by W. Li and Y. Tang

*Depositional paleoenvironment of the Achlada lignite deposits (Makedonia, NW Greece): A coal petrographic approach* by I.K. Oikonomopoulos, G. Kaouras, N. Tougiannidis, T. Gentzis and P. Antoniadis

*Characteristics of mineral matter in the bituminous coals, Keruh Formation, central Sumatera Basin, Indonesia* by A.K. Permana and M.H. Hermianto

*Geographic information system (GIS) representation of the coking coal areas of the United States* by M.H. Trippi and L.F. Ruppert

*Possible origin of alkali tonsteins developed in southwest China* by L. Zhao

### **Geobiology**

*Life in the coal seams of eastern Australia* by D.J. Midgley, C.J. Vockler, N. Tran-Dinh and P. Greenfield

*Ancient life at the extremes: Molecular fossils and paleoenvironmental contexts of a Neoproterozoic hypersaline setting* by R. Schintze and J.J. Brocks

*Changes in community composition on culture enrichment of native microbial consortium grown on coals of different ranks* by R. Susilawati, P. Evans, J.S. Esterle, S. Robbins, G. Tyson, S.D. Golding and T.E. Mares

*Geochemistry of microbial mats near natural oil seeps in marine arctic Canada* by J. Carrie, K. Foster, H. Sanei and G. Stern

*Origin and evolution of Asian dipterocarps: evidences from resin chemistry and palynological data* by S. Dutta (to be confirmed)

*Looking inside the black rocks, 'omic exploration of the coal microbiome* by N. Tran-Dinh, D.J. Midgley, S. Sestak, C.P. Rosewarne, C.J. Vockler, P. Greenfield and N. Sherwood

### **Organic petrology**

*Progress in Microscopy for Users in Organic Petrography* by H Behl

*Organic petrology and thermal maturity of the Upper Ordovician Utica Shale, southern Quebec, Canada* by O. Haeri Ardakani, H. Sanei and D. Lavoie

*Thermal insights in the MacArthur Basin based on bitumen reflectance and illite crystallinity* by S. Rodrigues, B.R. Ferguson, S.D. Golding and J. Bluett

*The effects of salt structures on the thermal maturity of adjacent sediments – examples from Australia & Brazil* by I.G. Rossetti and L.W. Gurba

*Characterisation of organic matter in the Duvernay Formation, Western Canada Sedimentary Basin: unravelling depositional and post-depositional regimes* by N. Van de Wetering, H. Sanei, B. Mayer and A Beaton

*Estimating the fusible content of individual coal grains and its application in coke making* by K. Warren, G. Krahenbuhl, M. Mahoney, G. O'Brien and P. Hapugoda

*Effects of igneous intrusions on thermal maturity of carbonaceous fluvial sediments:-a case study of the early Cretaceous Strzelecki Group outcrops in west Gippsland, Victoria, Australia* by H. Aghaei, L. Gurba, S.A. Mahmud and M. Hall

*Petrographic characteristics of the low sulphur coals from the Maastrichtian Mamu Formation, Anambra Basin, South East Nigeria* by I.M. Akaegbobi, J.C. Hower, M.N. Johnston, and E.C. Ibeh (to be confirmed)

*The localized effect of uranium on macerals: An example from Upper Triassic-Middle Jurassic Shemshak Group, northern Iran* by O. Haeri Ardakani, H. Sanei and A. Shekarifard

*Relationship between reflectance and colour of vitrinite grains under a microscope* by K. Harada, N. Hamada and Y. Ujiié

*Petrology and coal quality of early Jurassic coals in the exploratory hole ZKJ502 in Yining mining area, Xinxiang, China* by Y. Jiang, S. Dai, L. Zhao, X. Wang and G. Zhou

*Vitrinite reflectance suppression in the northern Denison Trough, Bowen Basin, QLD Australia* by A. Kalinowski and L. Gurba

*The origin and thermal evolution of macerals from the Mesoproterozoic Hongshuizhuang formation, northern north China* by Q. Luo, N. Zhong, J. Qin, Z. Li and L. Ma

*Vertical trends in maceral composition in inertinite-rich coals: A case study from the Galilee Basin* by L.J. Phillips, A. Roslin and S.A. Ayaz

*Splint coal: The hidden gremlin* by S. Pretorius and J. Esterle

*Coal dust explosibility and petrographic composition in coal seams of Amaga Formation, Sinifaná Basin-Colombia* by E. Rivera and A. Blandón

*Electrofacies analysis using high-resolution wireline geophysical data as a proxy for inertinite and vitrinite distribution in late Permian coal seams, Bowen Basin* by A. Roslin and J. Esterle

*Progress in studies on barkinite* by S. Wang, Y. Tang, D. Jiang, F. Huang, S. Su and H. Bai

## Source rocks & organic geochemistry

*An anecdote of Neoproterozoic-early Cambrian biota: synthesis from soluble and insoluble organic matter, western India* by S. Bhattacharya, S. Dutta and S.V. Raju

*Origin and evolution of biomarkers in cored Miocene sedimentary rocks from IODP Expedition 317, Canterbury Basin, New Zealand* by S. Bratenkov and S.C. George

*Thermal maturity assessment of early oil production from the Woodford Shale, Oklahoma, USA* by B.J. Cardott

*Critical considerations when assessing hydrocarbon plays using Rock-Eval pyrolysis and organic petrology data: Old methods for new challenges* by H. Carvajal-Ortiz and T. Gentzis

*Origin of natural gas-fed “eternal flames” in the Northern Appalachian basin, USA* by A. Drobniak, A. Schimmelmann, G. Etiope and Maria Mastalerz

*Carbon isotope of trace level gases trapped in fluid inclusions* by S. Gong, S. Sestak, J. Van Holst and S. Armand

*Organic geochemical characteristics of coal-measure source rock of lower-Palaeozoic in Dagang exploration area in Huanghua depression* by A. Hao, J. Li, J. Guo, D. Wang and Z. Li

*Dispersed organic matter and depositional environment: insights from a Middle Triassic source rock in arctic Canada* by D. Kondla, H. Sanei, A. Embry, O. Haeri Ardakani and C. Clarkson

*Geochemical characteristics of light hydrocarbon in gas source rocks thermal simulation resolving products in Kuqa Depression, Tarim Basin* by B. Lu, J. Li and C.Q. Ran

*The deadline of gas generation for humic coal* by J. Mi, S. Zhang, J. Chen and K. He

*Geochemical characteristics of stable carbon and hydrogen isotopes of gases from the Hongtai Gas Field, Turpan-Harmi Basin, China* by Y. Ni, J. Dai, D. Gong and D. Zhang

*Crude oil in Archean carbonates* by C.A. Peters, A. Dutkiewicz, S. Piazolo, G.E. Webb and S.C. George

*Geochemical evidence of degassing from water-soluble gas in Sinian - Cambrian reservoirs of Leshan - Longnansi paleo-uplift in Sichuan Basin, China* by S. Qin & W. Li

*Observation of hydrocarbon generation and expulsion of lower Jurassic coals from Turpan and Kequa (China) using diamond anvil cell pyrolysis* by C. Zhao, Y. Wang, Y. Zou, H. Wang, W. Zhao and W-L. Huanga

*Geochemical evaluation of middle Miocene –early Pliocene strata of Ob field, onshore Niger Delta Basin: implications for provenance, organic productivity, and paleoredox conditions* by O.A. Ehinola and O. Akanbi (to be confirmed)

*Comparative studies of the chemostratigraphic and petrophysical characteristics of Olar and Osar Fields Onshore Niger Delta, Nigeria* by O.A. Ehinola, & B.R. Olatunji (to be confirmed)

*Geochemical characteristics of natural gases in Upper Triassic Xujiahe Formation in southern Sichuan Basin, SW China* by S. Huang, Z. Wang, W. Wu, C. Fang and D. Liu

*Closed and semi-open system pyrolysis for estimating the timing of hydrocarbon gas expulsion from Paleogene coal* by K.U. Takahashi, N. Suzuki and H. Saito

## **Unconventional gas**

*Variation of gas generation and pore structure during coal pyrolysis* by Y. Cai, D. Li, Y. Yao, Z. Li and Z. Pan

*Variability of porosity and gas sorption within the Leichhardt Seam, Rangal Coal Measures, Bowen Basin, Central Queensland* by A. Dmyterko and J. Esterle

*New insight into Permian coals of eastern Botswana and its impact on coal seam gas properties* by M. Faiz, J. Potgieter, A. King and E. Crozier

*Multi-branched horizontal wells for coalbed methane production: field performance and well structure analysis* by T. Gentzis

*Variations of organic microfacies of Posidonia shale from north-western Germany (lower Saxony Basin) and the western Netherlands (the western Netherlands Basin): application to palaeoenvironmental reconstruction* by O. Gorbanenko and B. Ligouis

*Geological and engineering factors affecting coal seam gas development in the Gloucester Basin, NSW, Australia* by L. Gurba and S. Madden

*Reaction and mechanism of methane generation from low rank coals pyrolysis* by M. Li, F. Zeng, H. Liang, J. Xiang and W. Wang

*Organic petrology and microporosity of Cooper Basin gas shales, Australia* by Z. Li and N. Sherwood

*Effects of igneous intrusions on coalbed macerals, maturity and adsorption* by W. Li and Y-M. Zhu

*When using small samples to evaluate hydrocarbon reservoirs, proceed with caution* by L.F. Ruppert, R. Sakurovs, T.P. Blach and Y.B. Melnichenko

*A method of delineating emitting zones for optimising coal seam gas drainage* by A. Saghafi, K. Pinetown and H. Javanmard

*An unexpected effect of maceral composition on the swelling kinetics of coals in gases* by R. Sakurovs, G. Staib and E. Mac Gray

*An integrated geochemical and petrographic approach in studying the major unconventional reservoirs in Canada* by H. Sanei, O. Haeri Ardakani, N. Isinguzo and D. Kondla

*Pore characteristics of Wilcox Group coal, north Louisiana, USA: Relationships to gas, moisture, and coal depth* by S.M. Swanson, M.D. Mastalerz, M.A. Engle, B.J. Valentine, P.D. Warwick, P.C. Hackley and H.E. Belkin

*Organic geochemistry and pore system characterization of gas shales: an example from the lower Gondwana shales, eastern India* by A. Tewari and S. Dutta

*A new type of oil shale play occurred between salt intervals in Dongpu depression, Bohai Bay Basin, China* by M. Wang, Z. Li, N. Sherwood and S. Lu

*Natural occurring CO<sub>2</sub> in sedimentary basins in the US: Are there any similarities in the geochemistry of these basins?* by M.D. Corum and C. DeVera

*Conceptual models for unconventional shale plays in the Benin Basin, southwestern Nigeria* by O. A. Ehinola and O. A. Oluwajana (to be confirmed)

*Mercury content distribution characteristics in Chinese large coal-formed gas fields* by J. Li, Z. Han and Q. Yan (to be confirmed)



At left: South Coast coal measures. Photo provided by Colin Ward.



At right: South Coast Permo-Triassic section. Photo provided by Colin Ward.

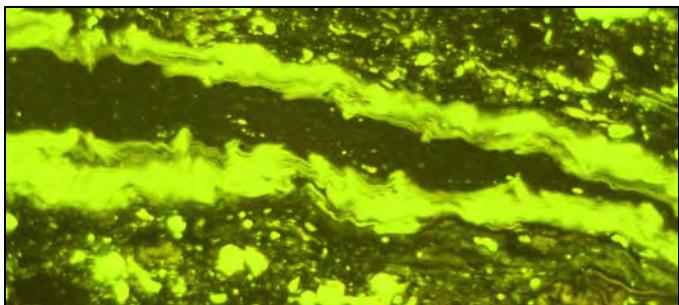
**32<sup>nd</sup> Annual Meeting  
The Society for Organic Petrology  
Yogyakarta, Indonesia  
19<sup>th</sup>-26<sup>th</sup> September, 2015**

***On the Edge: Hydrocarbons in the Tropics***

The Indonesian Archipelago is vast, diverse and exciting. The culture is as deep and varied as its geology and history. It is a region at the nexus or on the edge if you will, of almost everything; and that includes hydrocarbon generation. Indonesia has been exploiting petroleum for almost two hundred years and coal mining goes back even further.

Today, it is the world's top coal exporter. Thus, it is appropriate that the Society for Organic Petrology (TSOP) holds its 32<sup>nd</sup> Annual Meeting here in 2015 in the ancient city of Yogyakarta, in central Java.

Appropriate to the setting, the theme of the conference is hydrocarbon generation in the tropics. Just about all of the hydrocarbons (oil, gas and coal) in Indonesia are sourced from Tertiary age sediments. The paleogeographic setting throughout this time was strictly at the equator. Even today some of the largest peat deposits in the world occur on the islands of Sumatra and Borneo; understandably these have been used as modern analogues for coal formation throughout the scientific literature for decades. The mighty Mahakam River Delta, an area of vast oil and gas production, is yet another area often cited, quite literally, as a textbook example for deltaic processes and hydrocarbon accumulation.



*Fluorescing rootlet and matrix material from a Miocene age coal, East Kalimantan (photo by Tim A. Moore)*

**Theme:**

We are structuring the conference around the journey that organic materials take from their initial accumulation in peat or organic-rich sediments, through diagenesis to its ultimate extraction as coal, gas or liquid hydrocarbon. We are encouraging researchers to think about their work in this context and submit their papers identifying where along this thread their work lies. There will undoubtedly be presentations looking at the abundant resources of Indonesia in this light, but we also expect and wish to facilitate presentations from elsewhere in the world.

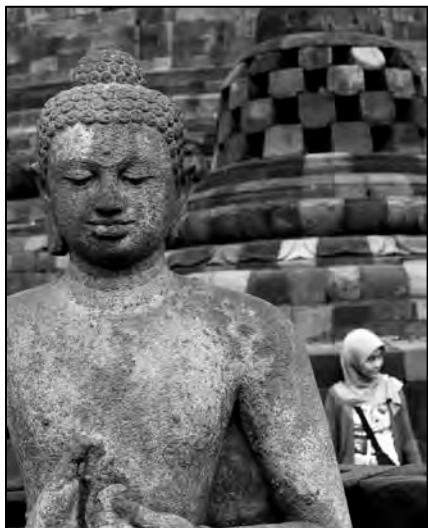


*Typical becak, Yogyakarta, Indonesia (photo by Tim A. Moore)*

**Program:**

There will be two full days of Technical Sessions (the 22<sup>nd</sup> and 23<sup>rd</sup> of September). Before the conference, there will be a field trip highlighting both the local geology and the culture of the Yogyakarta area; specifically, we'll visit Borobudur, which is the largest Buddhist temple in the Southern Hemisphere and is a World Heritage Site. The temple was originally built in 825 AD and rediscovered in the early 1800s. We'll finish off the day with a visit to a family run batik shop where we'll be able to see the different kinds of batiks being made and a chance to buy as many as we please!

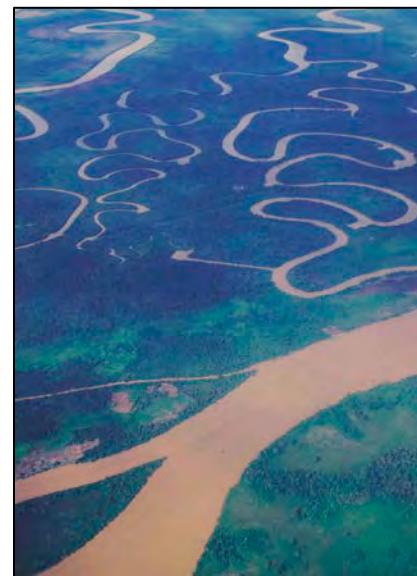
Also, before the conference, there will be two workshops, held concurrently. The first is an "Introduction to Organic Petrology". This course is designed as an introduction to organic petrology and is aimed at students, but will also be informative to technical and non-technical persons who work with coal. The two presenters are Drs Walter Pickel and Joan Esterle. Both Walter and Joan have given this course previously and we thank them for reprising their efforts for this conference. The second workshop is an "Introduction to Reserve and Resource Assessments" and is designed as an introduction to unconventional reserve determinations and is aimed at reservoir and reserve engineers and geologists. The two presenters, John Hattner and Dan Paul Smith are from Netherland Sewell & Associates Inc and are recognized experts in this field.



Borobudur Buddha and stupa (photo by Tim A. Moore)

Finally, there will be a 3-4 day post-conference field trip to the eastern part of Borneo to examine modern and ancient hydrocarbon formation. From Yogyakarta we'll take a 2 hr flight to Balikpapan in East Kalimantan (one of four Indonesian provinces in Borneo). We'll examine Miocene age sediments, which are mostly fluvial to near marine; these contain abundant coal seams and are the source of all the gas and liquid hydrocarbons in the area. The Mahakam Delta will also be explored while we examine some of the modern processes we have all

read about, but few visited. Finally, a visit to a modern peat mire will highlight what it really means to be in a swamp!



Mahakam River, near delta edge (photo by Tim A. Moore)

We know it is a bit of a journey, but most will find it is no harder to reach Yogyakarta than Sydney, Warsaw or Carbondale! Bring your science head but pack your togs for this tropical hydrocarbon experience on the edge.

Tim A. Moore  
2015 Meeting Organizer



## Coke Petrography

**Kevin DeVanney**  
**CoalTech Petrographic Associates, Inc.**

The interest in coke petrography for application as a research tool and problem solving technique seems to be increasing worldwide. Coke carbon forms produced from conventional coke-making are directly related to the coals used, and in particular, coal petrographic characteristics (reflectance and maceral composition). Therefore, including this overview in a newsletter that is an open forum on coal and related organic petrography is relevant.

Coke petrographic analysis or coke petrography, as used in this article, is synonymous with “coke carbon forms” and “coke texture analysis”. This very brief overview serves only to introduce the most commonly-used carbon form classification and some of the more common applications.

The coke petrographic technique used by CoalTech and other North American petrographers was developed at U.S. Steel (1986, R. J. Gray & K F. DeVanney) and later adopted as a test method by ASTM in the 1990's. The ASTM test methods applicable to this technique are D-3997 (for sample preparation) and D-5061 (for microscopic analysis). For coke microtexture analysis (coke petrography), the coke sample is crushed to 8- or 20-mesh X 0 and pelletized with binder in one-inch diameter molds. After hardening, the surface of the pelletized specimen is ground and polished for reflected light microscopy.

Most analysts use about 500X magnification, cross-polarized light, and a tint plate to add color to the small crystalline textural domains for easier identification. A total of 2000 points are identified per sample. The fundamental principles that make coke petrography useful are that different rank and type coals produce optically distinct coke carbon forms. A fundamental knowledge of coal petrography is needed to understand coke petrography.

Several photomicrographs are included to illustrate some of the features observed in coke using the same magnification and optical microscope system.

Coke carbon forms are broadly categorized into three main classes or categories; Binder Phase carbon forms, Filler Phase carbon forms, and Miscellaneous Materials. Binder phase carbon forms are formed by the carbonization of coal reactive macerals, e.g. mostly vitrinite. The term “binder” is used because these carbon forms collectively are the binding/bonding or cementing components during carbonization. Filler phase carbon forms are carbonized inert macerals. The term “filler” is used because they are the filler or aggregate component. Mineral matter, although inorganic, is included in the filler phase carbon forms since they do not contribute to bonding. Another category not included with the binder or filler phase consists of Miscellaneous Materials. These are materials or features not related to the parent coals used to produce the coke.

The **Binder Phase Coke Carbon Forms** are further subdivided on the basis of optical crystallinity and appearance. Bituminous high-volatile coals, when coked, will form isotropic binder phase, incipient binder phase, or circular anisotropic binder phase carbon forms. Coal reflectance (mean max. reflectance) V-types 6, and 7 generally form the isotropic binder phase, V-types 7 and 8 form the incipient binder phase, and V-types 9, 10, and 11 will form circular anisotropic textured binder phase coke carbon forms respectively.

Within the bituminous medium-volatile coal range, V-types 12, 13, 14 (in some instances V-types 11 and 15), form the lenticular anisotropic binder phase carbon forms. Bituminous low-volatile coals that have V-types 15, 16, 17, 18 present (and sometimes 14) will form ribbon anisotropic (fine, medium, and coarse) binder phase carbon forms respectively when coked. This relationship between coal reflectance (V-types) to the particular binder phase carbon form produced is most applicable to

blast furnace coke produced under normal carbonization conditions (coking temperature, coking rate, bulk density).

The coke carbon forms tend to shift to slightly different binder phase categories if produced under low-production foundry coke conditions, elevated temperature conditions in heat-recovery oven operations, or abnormally high or low coking rates in by-product slot ovens for furnace coke production.

**The Filler Phase Coke Carbon Forms** originate mostly from coal inert macerals. These carbon forms are differentiated microscopically on the basis of morphology and size. Organic Inerts less than 50-microns are considered “fine”. Inerts that are greater than 50-microns are classified as “coarse”. Inorganic Inerts or mineral matter are also quantified and subdivided on the basis of same size criteria. The size boundary of 50-microns was selected because it is the threshold where these inert-behaving components impact bonding and coke strength.

If coarse, the inerts tend to interrupt coke microstructure and cause zones of weakness while fine inerts are more easily incorporated in the coke

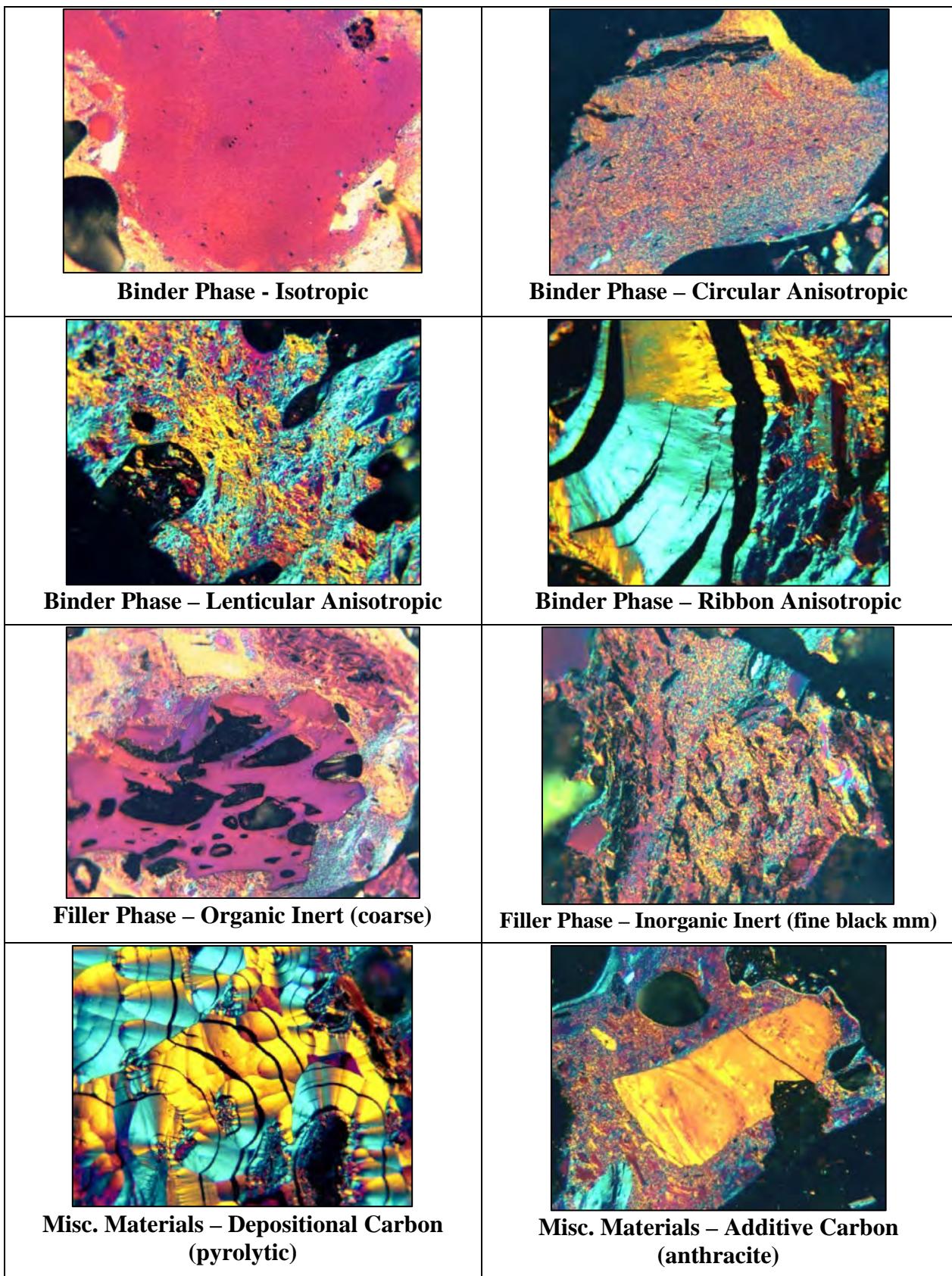
matrix and can add strength. Miscellaneous Inerts are other “inert-behaving” features recognizable in coke that can be quantified. This filler phase sub-category includes coked oxidized coal, coked inert pseudovitrinite, coked brecciated coal, and coked coal vitrinite that is too high or low in rank to soften and form pores. These features behave more like aggregates or fillers than binders.

An additional category of components are also quantified but are not directly related to the parent coals carbonized. This category is called **Miscellaneous Materials** and includes depositional carbons (sooty carbon, spherulytic carbon, pyrolytic carbon), additives (breeze, pet coke, anthracite), and non-coal-related inorganic material or contaminants (slag, iron bearing materials, refractory, etc.). Additionally, the presence of unaltered and softened coal, green coke (under-carbonized), and partial burnt coke is noted during the analysis.

The classification table included is summarized for this article. The more detailed classification with criteria for each category can be found in ASTM or other references cited at the end of this article.

### SUMMARIZED COKE PETROGRAPHIC CLASSIFICATION

<b>Coke Carbon Forms</b>	<b>General Origin or Source</b>
<b>Binder Phase</b>	
Isotropic & Incipient	Vitrinite (V-types: $\leq 6, 7, 8$ )
Circular Anisotropic ( <i>fine, intermediate, coarse</i> )	Vitrinite (V-types: 9, 10, 11)
Lenticular Anisotropic ( <i>fine, intermediate, coarse</i> )	Vitrinite (V-types: 12, 13, 14)
Ribbon Anisotropic ( <i>fine, intermediate, coarse</i> )	Vitrinite (V-types: 15, 16, $\geq 17$ )
<b>Filler Phase</b>	
Organic-Fine	Inertinite ( <i>micrinite, inertodetrinite, &lt;50 μm</i> )
Organic-Coarse	Inertinite ( <i>fusinite, semifusinite, ≥50 μm</i> )
Miscellaneous Inerts	Coked oxidized, brecciated, & non-coking coal
Inorganic-Fine	Various mineral matter ( $<50 \mu m$ )
Inorganic-Coarse	Various mineral matter ( $\geq 50 \mu m$ )
<b>Miscellaneous Materials</b>	
Depositional Carbons	Sooty, spherulytic, pyrolytic carbons
Additive Carbons	Coke breeze, anthracite, petroleum coke
Misc. Observations/Features	Green coke, partly burnt or reacted coke



Coke petrographic analysis can provide the following: a post-mortem estimation of the blend reflectance, the blend percentages by approximate rank used to produce the coke, an estimate of inert richness or inert deficiency, identify presence of oxidation or other undesirable coal-related features, and identify over-heating or high temperatures (excessive depositional carbons) or insufficient heating (presence of green coke) during carbonization.

The main applications of this microscopic technique in the past has been to solve industrial plant problems related to coal quality or operational excursions within the coke plant environment, and to identify coke quality and variability. All of these situations affect coke quality and ease of pushing the coke from the ovens. It has also been a useful research tool to explain why certain coals “coke” poorly, to provide a means to control or enhance coke reactivity (CRI/CSR), and to study new emerging coke-making technologies.

As a general observation, most North American by-product recovery coke plants use mostly HV coals, with a moderate (smaller) amount of MV, and less LV. Heat recovery coke plants typically use more medium- and low-volatile coal in their blends compared to by-product recovery plant. A few plants, particularly foundry coke producers, use inert additives, like pet coke, breeze, and anthracite to achieve the coke quality desired. From coal petrography data, the blend reflectance ( $R_{max}$ ) used by these coke producers typically ranges from about 1.10 to 1.30 with inert levels of 22 to 34%. These same ranges are observed from coke petrographic techniques by estimating the coal reflectance from the coke binder phase carbon forms, and estimating the coal inert content from the coke filler phase carbon forms.

There are numerous technical papers on this subject dating back to the 1970's. The two references listed below are listed to give interested readers a good starting point.

#### References Cited:

Gray, R.J. and DeVanney, K.F., “Coke Carbon Forms: Microscopic Classification and Industrial Applications” International Journal of Coal Geology, Vol 6, 1986, pp. 277-297.

ASTM International – Annual Book of ASTM Standards, 2014, Gaseous Fuel; Coal & Coke, Section 5, Volume 05.06, Methods D 3997 & D5061.

Kevin DeVanney  
CoalTech Petrographic Associates, Inc.  
Murrysville, PA, USA



Hunter Valley coal mine, NSW, Australia. Photo provided by Colin Ward.

## 2014 Ohio Valley Petrographer Meeting

**Kentucky Geological Survey  
Core Storage Facility  
Lexington, KY, USA  
March 21st, 2014**

The fifth annual Ohio Valley Petrographers' Meeting took place on March 21st this year at the Kentucky Geological Survey Core Storage building in Lexington, Kentucky. This annual meeting is designed for those involved in organic petrography to share their research and provide opportunity for students to present their studies and receive feedback. Coffee and donuts were generously provided by W. Nuhsbaum, Inc. and Leica. After introductory remarks by Jim Cobb, Kentucky State Geologist and director of the Kentucky Geological Survey, the presentations began. Below is a list of the presentations given by both students and researchers over the course of the day.

"Organic petrology of the Aptian section in the down dip Mississippi Interior Salt Basin, Mississippi, USA: observations and preliminary implications for thermal maturation history" - Brett J. Valentine.

"Fungal indicators of depositional environment and decompositional pathways in a Paleocene Wilcox Group Coal from Texas" - S.J. Brooke, M.N. Johnston, M.N., J.M.K. O'Keefe.

"Pore Characteristics of the Wilcox Group Coal, U.S. Gulf Coast Region: Relationships to Biogenic Gas" - Sharon M. Swanson, Maria D. Mastalerz, Mark A. Engle, Brett J. Valentine, Peter D. Warwick, Paul C. Hackley and Harvey E. Belkin.

"Organic Petrography of New Samples of Sunbury Shale" - J.M.K. O'Keefe, C.E. Kason, B. Perkins.

"Devonian black shale" - Alice O'Bryan. Alice is studying the Cleveland Member of the Ohio Shale in NE Kentucky.

"Evolution of porosity in organic-rich shales: Influence of Soxhlet-extractable bitumen/oil during thermal maturation" - Lin Wei.

"Organic petrology of the Utica shale" - Cortland Eble, John Hickman and David Harris.

"Structural Parameters that Influence Coke Quality" - Solomon Nyathi.

"Exploration of relationship between organic sulfur and technological properties of coal samples" - Lei Zhang.

"CO emissions from an eastern Kentucky coal fire" - Madison Hood.

"A preliminary examination of the organics in serpentine soils from southeastern Pennsylvania" - Jim Hower.



### 2014 Ohio Valley group

1<sup>st</sup> row left to right:

Lei Zhang (University of Kentucky Mining Engineering & China University of Mining & Technology – Beijing)  
Madison Hood (University of Kentucky CAER & Dunbar High School, Lexington, KY)  
Shane Smallwood (Indiana University)  
Sharon Swanson (USGS)  
Alice O'Bryan (University of Kentucky Earth & Environmental Sciences)  
Maria Mastalerz (Indiana Geological Survey)  
Lin Wei (Indiana University)  
Carley Gasaway (Indiana University)  
Brandon Nuttall (Kentucky Geological Survey)

2<sup>nd</sup> row:

Solomon Nyathi (Indiana University)  
Sharon Brooke (Morehead State University)  
Rachel Walker (Country Mark Oil & Gas)  
Brett Valentine (USGS)  
Cagla Akar (Indiana University)  
Agnieszka Drobniak (Indiana Geological Survey)  
Jen O'Keefe (Morehead State University)  
Jim Hower (University of Kentucky CAER)  
Cortland Eble (Kentucky Geological Survey)

## CALENDAR OF EVENTS

[www.tsop.org/cal.htm](http://www.tsop.org/cal.htm)



**2014**

**September 16-19:** ICCP Organic Petrology in Industrial Applications Short Course, Dhanbad, India.

[www.iccop.org/2014-iccp-training-courses/](http://www.iccop.org/2014-iccp-training-courses/)

**September 20-26:** 66<sup>th</sup> Annual ICCP Meeting, Kolkata, India. [www.iccop.org](http://www.iccop.org)

**September 27 – October 3: 31<sup>st</sup> Annual TSOP Meeting, Sydney, Australia.**

<http://wp.csiro.au/tsop2014>

**September 28 - October 3:** 4<sup>th</sup> International Palaeontological Congress, Mendoza, Argentina.

[www.ipc4mendoza2014.org.ar/](http://www.ipc4mendoza2014.org.ar/)

The Congress includes the 47<sup>th</sup> AASP-TPS Meeting  
[www.palynology.org/upcoming-aasp-meetings](http://www.palynology.org/upcoming-aasp-meetings)

**October 6-9:** Pittsburgh Coal Conference, Pittsburgh, Pennsylvania, USA.

[www.engineering.pitt.edu/pcc/](http://www.engineering.pitt.edu/pcc/)

**October 12-18:** Earth Science Week!

[www.earthsciweek.org](http://www.earthsciweek.org)

**October 13-17:** 34<sup>th</sup> Oil Shale Symposium, Golden, Colorado, USA.

<http://csmospace.com/events/oilshale2014/>

**October 19-22:** Geological Society of America Annual Meeting, Vancouver, BC, Canada.

[www.geosociety.org/meetings/2014/](http://www.geosociety.org/meetings/2014/)

**2015**

**May 4-7:** World of Coal Ash Conference, Nashville, Tennessee, USA.

**May 31 – June 3:** AAPG Annual Convention & Exhibition. Denver, Colorado, USA.

**September 19 – 26: 32<sup>nd</sup> Annual TSOP Meeting,** Yogyakarta, Indonesia. Website to come soon!

**Please send in meeting, short course and special event announcements to the Editor!**

**For more geology event information, see:**  
[calendar.agiweb.org/index.html](http://calendar.agiweb.org/index.html)





Sydney Harbour, the Botanical Gardens and the Rocks District.  
Photos provided by Colin Ward.





# THE SOCIETY FOR ORGANIC PETROLOGY



## 31<sup>st</sup> Annual Meeting

*Organic Matter Down Under II*

### Sydney, Australia

27 September – 3 October 2014



### Conference Themes

- Organic petrology for unconventional gas
  - Microbiology of organic-rich rocks
  - Fugitive emissions and CO<sub>2</sub> storage
  - Coal behaviour in utilisation
  - New techniques in organic petrology and geochemistry
- Papers on other aspects of organic petrology and geochemistry are also welcome*



### Short Courses

Applications of coal petrology  
Digital core analysis

### Field Trips

Southern Sydney Basin  
Hunter Coalfield

**Register to Attend Now!**

Details: <http://www.tsop.org>

