THE SOCIETY FOR ORGANIC PETROLOGY

NEWSLETTER

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The 2022 38th Annual TSOP Meeting will be an Online Meeting

2022 38th Annual TSOP Meeting

As soon as Council approved the 2022 Virtual meeting, we started planning, beginning with appointment the Organising Committee, which we considered crucial. We wanted to bill this meeting, which would have no fixed 'abode' as a "Global" TSOP meeting and thus we wanted our Organising Committee to be represent that.

We have 16 members, from six of the seven continents (understandably Antarctica is not represented!) representing 10 countries - see table below.

Region	Member	Organisation	Country	City
Australia	Dr Sandra Rodriques	University of Queensland	Australia	Brisbane
	Dr Tim A Moore	Cipher Consulting Pty Ltd	Australia	Brisbane
	Dr Carol Sule	Woodside Energy	Australia	Perth
Asia	Prof Shifeng Dai	China University of Mining and Technology	China	Beijing
	Prof Hendra Amijaya	University of Gadjah Mada	Indonesia	Yogyakarta
Africa	Prof Ofentse Marvin Moroeng	University of Johannesburg	South Africa	Auckland Park
	Dr Alex T. Wheeler	Independent Consultant (recent UQ graduate)	South Africa	Bloemfontein
Europe	Prof Hamed Sanei	Aarhus University	Denmark	Aarhus
	Prof Andreas Busch	Heriot-Watt University	Great Britain	Edinburgh
	Dr Grzegorz Lis	Instytut Nauk Geologicznych, Uniwersytet Wrocławski	Poland	Wrocław
North America	Dr Paul Hackely	U.S. Geological Survey	U.S.A.	Reston
	Ms Leslie 'Jingle' Ruppert	U.S. Geological Survey	U.S.A.	Reston
South America	Prof Wolfgang Kalkreuth	Instituto de Geociências, UFRGS	Brazil	Porto Alegre
	Prof Jill Pearse	Universidad de los Andes	Colombia	Bogotá
	Prof Carme Huguet	Universidad de los Andes	Colombia	Bogotá
TSOP Pres	Kaydy Pinetown	CSIRO	Australia	Sydney

The Society for Organic Petrology

TSOP is a society for scientists and engineers involved in 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 website, Facebook Page, quarterly newsletter, annual meeting program and abstracts and special publications. Members are eligible for discounted subscriptions to Elsevier journals ***International Journal of Coal Geology*** and ***Review of Palaeobotany and Palynology***.

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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 editor@tsop.org

Membership Information:
Please report any changes in address or contact information to Brett Valentine, TSOP Membership Chair:
bvalentine@usgs.gov

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

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

Newsletter Submission Deadlines

March Issue: March 10th, 2022
June Issue: June 10th, 2022
September Issue: Sept. 10th, 2022
December Issue: Dec. 10th, 2022

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President's Letter

Dear TSOP Members,

It is a pleasure and an honour to be writing my first TSOP President's letter. I would like to express my thanks to TSOP members for entrusting me with this role and I hope that I can fill the big shoes left behind by outgoing TSOP President, Paul Hackley. I've appreciated Paul's leadership and guidance over a very challenging period: as professionals working in fossil fuel sciences our world is changing rapidly, and as global citizens we've had a fair share of obstacles and uncertainties resulting from the pandemic.

I'm pleased that Australia is slowly opening its borders to the rest of the world. As a migrant it has been particularly hard not being able to visit my family abroad for over 3 years. I remain hopeful, however, that 2022 brings opportunities for all of us to re-engage with loved ones near and far, and that COVID-19 related restrictions are only necessary in severe situations. As Australians my family and I have much to be grateful for. We have mostly been spared significant impacts of COVID-19, except for the 2021 Term 3 lockdown when I was working from home and supporting my son's learning from home. My key lesson from that experience – I am not meant to be a Kindergarten teacher! Thankfully the school year will end with my son back at school, and we are all excited about him starting Year 1.

This year I celebrated my 15th year employed at the Australian Government's Research Organisation, CSIRO. The organisation has changed significantly since I joined. Many of those changes were in response to changes in our external environment but I can proudly say that integrity and high-quality research remain core values for all CSIRO staff despite changes in research directions. Colleagues and I based in Sydney have recently relocated between two sites; anyone having to deal with laboratory moves can appreciate how stressful and disruptive that may be. The move is now almost finalised (even though it's been a few years in the making) and over the coming months we should be settled at our new location, so if you find yourself visiting Sydney, please get in touch.
I wish to commend the organisers of the 2021 TSOP Annual Meeting for hosting a well-organised and successful event. This first ever virtual TSOP meeting has paved the way for what I like to call 'TSOP Global' in 2022, a second virtual TSOP Annual Meeting but this time organised by a committee representing all regions of the world and I am excited about arrangements for the meeting, which is being chair by Tim Moore. The energy sector is evolving with the aim to decarbonise which will present opportunities for organic petrology and related disciplines, and I trust that these opportunities will become more obvious during our upcoming meetings and events.

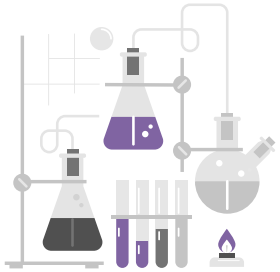
From my family to you and your loved ones, our sincere wishes for an enjoyable and peaceful Christmas. May 2022 be one step closer to life before the pandemic and bring successful moments in work and life.

Best wishes,

Kaydy Pinetown, TSOP President 2021-2023

TSOP is an AAPG Affiliated Society.
Abstracts from annual meetings are available through **AAPG Datapages**

www.facebook.com/OrganicPetrology



TSOP Membership Dues

TSOP dues payments are due on or before **December 31st each year.** We encourage you to check your dues status and make your payment so that you can continue your TSOP membership and support the society and its work.

TSOP dues are currently set at:

Individuals:
- $25 per year or
- $100 for 5 years (5 years for the price of 4!)

Students:
- $15 per year

Institutional/Corporate:
- $75 per year

You can use our convenient online dues payment system to pay dues by credit card.

You can login at the Members Only TSOP website and select 'Online dues payment' or go to www.tsop.org/dues and access the online form without logging in.

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

GLOBAL VIRTUAL MEETING

38th ANNUAL MEETING OF THE SOCIETY FOR ORGANIC PETROLOGY

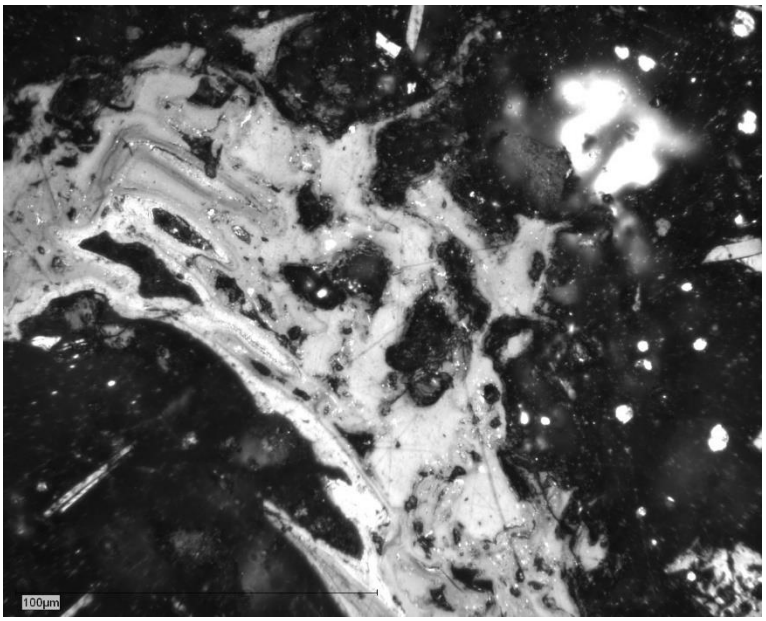
Mark your calendars! We have set the dates for the 38th Annual Meeting of TSOP. It will be virtual, and it will be great. Plan ahead and clear your schedules.

TSOP for 2022 will be from **12th to 16th of September 2022.**

The workshop will be held on the **12th and 13th of September 2022**. The title is "***Spatially resolved techniques and applications of organic petrography in shale petroleum systems***" and will be given by Paul Hackley, Aaron Jubb, Ryan McAleer, Brett Valentine, and Justin Birdwell, all from the U.S. Geological Survey.

A description of the workshop is:

This full-day course will present a comprehensive review of spatially resolved techniques for organic petrography and spectroscopy in shale and mudrock. Topics will include sample preparation via ion milling techniques, vibrational spectroscopy, fluorescence spectroscopy, mass spectrometry imaging, surface chemistry and topology, electron microscopy, synchrotron-based analysis, correlative microscopy/spectroscopy, and instrument integrations. Examples will focus on petroleum system applications, including thermal maturity interpretation, conversion of sedimentary organic matter to petroleum, and development of organic porosity. Advantages and limitations of each technique will be highlighted with examples from the instructor's research and the open literature (see example image below).



Early Cretaceous degradosemifusinite from the Yimin Formation of Inner Mongolia. Possible evidence for both extensive wildfires and secondary alteration of charcoals in a fluctuating climate (see Moore et al. 2021 and Wheeler et al., 2021).

Moore, T.A., Moroeng, O.M., Shen, J., Esterle, J.S., Pausch, R.C., 2021. Using carbon isotopes and organic composition to decipher climate and tectonics in the Early Cretaceous: An example from the Hailar Basin, Inner Mongolia, China. Cretaceous Research 118, 104674, https://doi.org/10.1016/j.cretres.2020.104674, 25 pp.

Wheeler, A., Moore, T.A., Shen, J., Moroeng, O.M., Liu, J., Jia, R., Chen, K., Zhang, Y., 2021. Composition of an Early Cretaceous, Eurasian, intracratonic basin peat-forming flora: Deep time assessment of climatic and environmental conditions, Inner Mongolia, China, 37th Annual Meeting of The Society for Organic Petrology. TSOP, Virtual, 3pp.

There may be a second, concurrent workshop, but this is still being planned. Stay tuned!

The Technical Sessions will be run over three days, four hours each day from the **14th to 16th of September 2022**. More detail on themes and subthemes will follow soon, but we are looking for the best from our membership as well as wanting to pull in new topics and new people.

A departure from standard TSOP meetings will be a Roundtable discussion with 4-5 experts from around the globe from government, academia and industry and will focus on the role and future of fossil fuels in a net zero carbon world. This is something that should be of interest to every geoscientist who works with organics.

We are currently securing the panel members and will let you know the final topic, structure and format but the roundtable will last for about 60 mins. It should be lively and definitely will be enlightening. Tell your colleagues who might otherwise not be interested in the technical aspects of organic petrology. We are going to open the Roundtable up to others for a small, separate fee.

The website with more information will soon be up after the New Year. We'll send out an email to members then; but please, when that link comes, pass it to others who are non-TSOP members. We think this meeting will have wide appeal for many geoscientists and geochemists as well environmental scientists.

If you have questions and input do not hesitate to send us an email at tsop2022@ciphercoal.com.

EMISSIONS DURING GRILLING WITH WOOD PELLETS AND CHIPS

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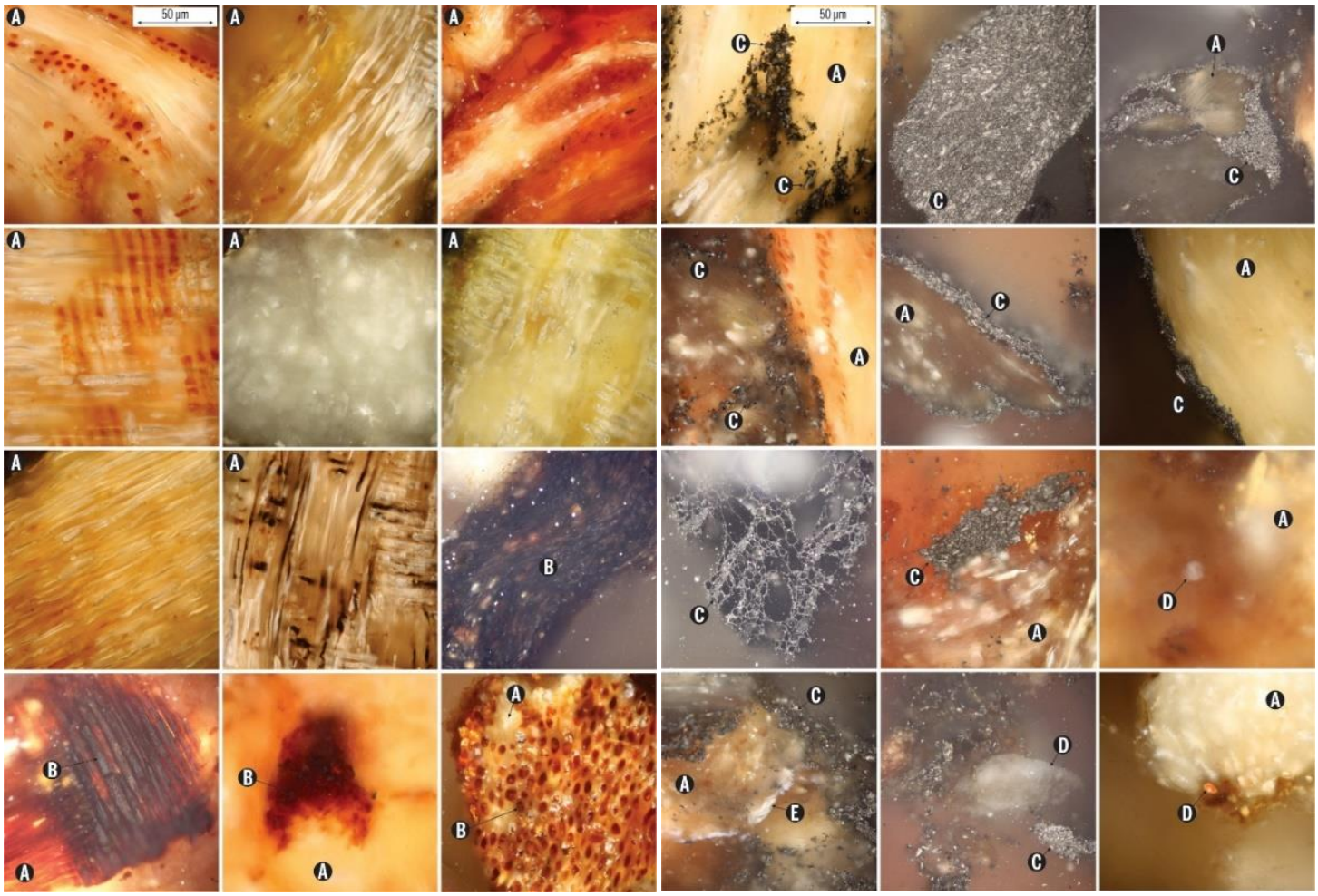
See the full article at: https://doi.org/10.1016/j.aeaoa.2021.100140

The quality check of grilling wood pellets should be of a critical importance as smoke from their combustion has a direct contact with food, impacts human safety, and pollutes the atmosphere. Therefore, the main purpose of this study is to investigate the purity of grilling wood pellets and chips available on the market, analyze the properties of their combustion gases, and determine if a relationship between the fuel composition and emissions during grilling can be established.

In this study, we investigated 45 types of BBQ wood pellets and wood chips available for purchase in the USA and Europe. Based on reflected light microscopy analysis, the samples are composed dominantly of biomass, ranging from 87.5 to 99.8 vol. % for wood pellets and 96.5 to 99.1 vol. % for wood chips, with the average impurities content of 1.7 vol. % for wood pellets and 2.2 vol. % for wood chips. The undesired components included bark, mineral matter, charcoal, coke, metal, rust, slag, and petroleum products.

Our data show that grilling with wood pellets and chips leads to elevated emissions of particulate matter (PM), NO_2, SO_2, CO, CO_2, and formaldehyde in comparison with recommended exposure limits. The average emissions of PM are higher from wood chips than from pellets by approximately 85 μg/m^3, and they come mainly from $PM_{2.5}$; the contribution from PM of 2.5 to 10 μm in size is rather insignificant. CO_2 emissions, on average 2.67 % from pellets and 2.27 % from wood chips, were elevated comparing with a typical outdoor air level of 0.03 to 0.05 % (300-500 ppm). The level of emissions of individual components also changes during the grilling cycle, and depends on the type of combusted wood, grilling conditions and fuel moisture content.



Photomicrographs of wood pellet and chip components in reflected white light and oil immersion.
Scale bar is the same for all photomicrographs.
A – biomass, B – bark, C – charcoal, D – mineral matter, E – petroleum products.

Expressive Bittersweet Association of Sulfur with Coal

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Coal is a complex mixture of carbon, hydrogen, nitrogen, sulfur, and oxygen (CHNSO) elements and, to a lesser extent, of most of the elements from the periodic table. Among these, the association of sulfur with the organic matter in coal has gained much attention in the past due to its both adverse and cooperative characteristics.

The occurrence, association, and roles of sulfur in coal have averred their importance in prime discussions for many decades among scientists and industrialists. Sulfur is often considered to flaunt deleterious relation with the environment as it is the primary source of acid mine drainage and acid rain. Sulfur-bearing minerals host mostly mercury and lead, which are harmful to human health. Also, sulfur produces slag and corrode the boilers, and its presence alleviates the coke production. Meanwhile, it indeed has some positive aspects in emerging areas like enhanced pyrolysis of kerogen and coal hydroliquefaction. There are two major forms of sulfur associated with coal, i.e., organic and inorganic (pyritic and sulfate). Out of these, the organic sulfur imparts harmful effects during utilization if present in a large abundance. The biogeochemical processes, i.e., the bacterial sulfate reduction (BSR) and the thermochemical sulfate reduction (TSR), responsible for the sulfurization of organic matter in coal, have long been a matter of investigation for researchers around the world. Diverse biogeochemical processes are responsible for incorporating sulfur in organic compounds, either via intramolecular way forming cyclo-sulfur groups including thiophene/thiane, or intermolecularly via forming C-S-C bonds (Werne et al., 2004). However, any complete set of biogeochemical processes responsible for incorporating sulfur (sulfurization) in the organic matrix is still ambiguous. Also, another uncertainty lies in the form of sulfur that gets incorporated into the organic matter (Werne et al., 2004). The enrichment of organic sulfur in coal-forming peat is primarily governed by the availability and reactivity of reduced sulfur species (H_2S, HS^-, polysulfides), reactive organic matter, reactive iron, and the sulfur concentration in the pore water.

Further, the exact assessment of the set of processes in both BSR and TSR leading to the sulfurization of organic matter is still ambivalent. Although the products of both of these processes are the same, these may, however, have different kinetic and thermodynamic perspectives. Hence, the knowledge gap lies in how these two mutually exclusive processes with a different set of diagenetic environments yield a similar reduced sulfur species (Machel, 2001). Besides, why some coal deposits are rich in sulfur compared to others is another quest that may fuel the inquisitive minds to quench.

The answer lies in understanding the genesis of such coal deposits, including the paleoenvironment of peat deposition and geological processes that prevailed during the peat accumulation. In brief, there are three significant sources of sulfur to the coal-forming peat. Sulfur can be found in peat swamps due to dissolved sulfate ions through the incursion of seawater. The marine water incursion in the peatland is one of the most preferable pathways for the high sulfur inclusions in the organic sedimentary deposits. However, high sulfur abundance may not necessarily indicate the marine incursion; instead, this may imply the effects of pH conditions. The sulfur enrichment in organic matter may also suggest a strong alkaline condition (high pH) with the plausible proliferation of sulfate-reducing microbes and high sulfate concentrations in the pore water.

On the other hand, low abundance of sulfur in organic matter may point towards circumscribed sulfur supply to the peatland, low abundance of sulfate in the pore water, and the dearth of sulfate-reducing bacteria in an acidic or low pH condition. Sulfur can also be supplied from the parent plant material. Another source of sulfur could be attributed to the precipitation of atmospheric water. Sulfur can enter the atmosphere through dust particles from continents, drops of seawater (Sea-spray), and volcanic eruptions. Then the process of sulfurization is triggered either through microbial reduction or thermochemical processes. In microbial reduction-induced sulfurization, two pathways, viz. assimilatory sulfate reduction and dissimilatory sulfate reduction, play crucial roles. The biosynthesized organosulfur compounds, such as methionine and cysteine, are formed during the assimilatory sulfate reduction, representing microbes as one of the sources of organic sulfur (Abdulla et al., 2020). Conversely, in the dissimilatory sulfate reduction mechanism, the sulfate-reducing bacteria incorporate sulfate to gain energy as the terminal electron acceptor in anaerobic respiration, further reducing sulfate to H_2S.

The by-products of using sulfur-rich coals in thermal power plants and steel-making industries may have profound detrimental effects on processing equipment, air pollution, metal pollution of soil and aquatic environments. Because of these reasons, myriad sulfur-rich coal deposits are still not used in many industries. However, these coals may be desulfurized, if possible, to enhance their utility in the industries. Further, keeping the hostile effects aside, these sulfur-rich coals are beneficial for coal conversion processes (Wijaya and Zhang, 2012), giving a ray of hope to economically sustainable industrial development.

Further, the lone electron pair of the sulfur attached to the Fe^{+2} may snatch the hydrogen from kerogen and enhance its hydrocarbon potential in the source rocks. Additionally, an adequate amount of organic sulfur in kerogen may also elevate its hydrocarbon generation potential. The C–S bonds in the organic sulfur-rich coals are more labile than the C–C and C–O bonds. Thus, it easily ruptures at the lower thermal maturity, which may help crack hydrocarbons before the peak catagenetic maturation. Hence, these catalytic activities of sulfur may augment the values of sulfur-rich coals in low-temperature pyrolysis and coal liquefaction processes.

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Abdulla, H. A., Burdige, D. J., & Komada, T. (2020). Abiotic formation of dissolved organic sulfur in anoxic sediments of Santa Barbara Basin. *Organic Geochemistry*, *139*. https://doi.org/10.1016/j.orggeochem.2019.05.009

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Wijaya, N., & Zhang, L. (2012). Generation of ultra-clean fuel from Victorian brown coal - Synchrotron XANES study on the evolution of sulphur in Victorian brown coal upon hydrothermal upgrading treatment and thermal pyrolysis. *Fuel*, *99*, 217–225. https://doi.org/10.1016/j.fuel.2012.04.012

CALENDAR OF EVENTS

2022

Please send in meeting, short course and special event announcements to the Editor
http://www.tsop.org/events.html

July 10-15, 2022
Goldschmidt Conference - Chicago, IL, USA

September 12-16, 2022
38th TSOP Annual Meeting – Global Online Meeting

September 19-25, 2022
73rd ICCP Annual Meeting - New Delhi, INDIA

October 9-12, 2022
GSA Annual Meeting - Denver, CO, USA