ICCP PSEUDOVITRINITE WORKING GROUP

Response Form

Summary of Comments Received

Have you observed any material resembling pseudovitrinite in coals on which you have worked? YES/NO
If YES please provide the following information:

*1. **What criteria were used to identify the material?***

- Morphology, reflectance.
- Optical characteristics; greater reflectance, slitted surface, cellular structure, fissuration, the absence of pyrite and other inclusions.
- Specific optical features: slitted surfaces, marked fissuration of the whole vitrinite particle; slightly higher reflectance.
- Physico-optical properties.
- Very delicate but distinct slitted pattern and higher reflectance than telocollinite.
- Mean reflectance usually 0.02 higher than measured on telocollinite in the same sample; presence of slightly curred slit-like openings; marked fissuration.
- (1) Absence of other macerals; (2) higher Ro than vitrinite; (3) slitted structure; (4) serrated particle edges; (5) remnant cellular structure.
- Pseudovitrinite has reflectance higher than that of vitrinite and **is still not vitrinite**.
- Wide collotelinitic lenses with characteristic slits, and reflectance slightly higher than that of normal collotelinite.
- It exhibited higher reflectance than the rank telocollinite, commonly showed S-shaped slits.
- Higher reflectance than normal V; relief, typical cracks.
- The same as Benedict et al. (1968).
- Morphological criteria (compare with Benedict et al., Fuel 47(2) pp 125-143, 1968).
- Slits, in part reflectance.
- Benedict et al.
- Only varying degrees of slits and possibly higher reflectance.
- Greater reflectance, slitted structure, remnant cellular structure, fracture pattern,

2. ***What is the rank (or rank range) of the coals in which the material has been observed?***

- 0.8-1.6 Rmax(%);
- from low to high-rank coals (0.8-1.7%);
- High-volatile bituminous coals with 0.65-0.75 % Rmax.
- High-volatile / medium volatile bituminous coal.
- Low-volatile bituminous coals.
- High-volatile bituminous C, R_o = 0.61 (standard deviation s=0.04).
- High-volatile C to A bituminous, medium volatile bituminous, low-volatile bituminous.
- Gondwana (Permian) of India of bituminous rank.
- My observations cover coals ranging from 0.7% Ro up to 1.25% Ro.
- Rr=0.68 % measured on collotelinite (excluded pseudovitrinite).
- There are many coals: lignite (Rv=0.29-0.39%); Subbituminous (Rv=0.5%; Bituminous (Rv=1.5%).
- Ro 0.7-0.8%.
- Rmax % = 3.86 (telocollinite); R % = 3.20 (vitrinite).
- High-volatile A+B, and higher.

- High-volatile bituminous.
- High-volatile bituminous is most common, but also higher rank.
- R_{max}=0.6-1.1 % on telocollinite.

3. ***What is/are the geological age(s) of the coal(s) involved?***

- Lower Cretaceous
- Carboniferous (Appalachian coals) and Cretaceous (Western Canada).
- Neogene: Miocene-Oligocene; Appalachian bituminous coals.
- Carboniferous (Westphalian).
- Carboniferous.
- Upper Carboniferous (Westphalian C).
- Middle Pennsylvanian.
- Permian of Gondwana (India).
- Permian (South Africa), Upper Carboniferous (Upper Silesian).
- Permian.
- Oligocene; Miocene, Pliocene,; Jurassic;
- Upper Carboniferous (Westphalian).
- Westphalian B, Penarroya-Belmez-Espiel Basin, Spain.
- Upper Carboniferous.
- Upper Carboniferous; Jurassic.
- Permian.
- Permian

4. **What is the general maceral composition of the coal(s) containing pseudovitrinite?**

- Relatively high inertinite content (up to 50 Vol (%), low liptinite content, in general <2Vol(%);
- Vitrinite 70-80 %; Pseudovitrinite 5-15 %; Exinite 2-3%; Inertinite 5-10 %; Mineral Matter 4-7 %;
- > 80% vitrinite, 10-12% exinite, **< 11% inertinite**; 7-10 % carbomineerite
- Vitrinite: 60-95%; Inertinite: 6-22%; Liptinite: 4-14%.
- Ca 85% of vitrinite; 4% of exinite; 11% of inertinite.
- Vitrinite = 61% vol, Liptinite = 12% vol; Inertinite = 23% vol; Mineral matter = 4% vol.
- 80-90% vitrinite; 4-20% inertinite; 2-7% liptinite.
- Vitrinite higher than 50 %, exinite less than 10% and inertinite forming the rest.
- Vitrinite rich.
- L=5%; I=10%; V=85% (pseudovitrinite=13%).
-

Coal	SG	G1	Z5	H4	Com	Co2
V %	59.8	45.1	63.5	35.3	61.4	53.4
L %	2.4	1.2	1.2	0.9	5.3	7.1
I %	3.4	3	0.5	1.1	6.2	10

- Changing, three group of maceral are always present, but pseudovitrinite often occurs in coal layers enriched in inertinite, but is not rule.
- V+L = 78%; I = 17%; MM = 5%.
- Vitrinite dominant, inertinite, liptinite.
- Claritic.
- Variable.
- Mainly vitrinite-rich, but also inertinite-rich.

5. ***Are the pseudovitrinite-bearing samples from***:

Drill cores or cuttings; active mine or plant-feed samples; exposed stockpiles, outcrops etc

- Mainly from mine sites (surface), cuttings and outcrop, less frequently from core
- Plant-feed samples.
- Plant-feed samples.
- Active mine.
- Active coal mines (500 m below ground surface).
- The fresh coal samples extracted from the 215 coal seam face at the depth of 550 m under the ground level.
- Drill cores; active mine samples (less than 30 m).
- Drill cores, active mine, plant-feed samples.
- Active mine samples (400-600 m).
- Active mine.
- Active plant-feed samples or mine.
- Drill core (17-270m).
- Drill cores (413 m).
- Active plant-feed samples or mine.
- Mines.
- Drill cores (100-600 m) and coal mines.

What depth range (below ground surface) is involved?

- 60-200 m;
- Depth range below 500 m.
- 550 m under the ground level;
- less than 30 m;
- 100 to 1000 m.
- 400 - 600 m.
- 200-400; 20-80; 20-80; 30-70; 30-70; 400; 300
- interval between 17-270 m deep;
- 413 m;
- 100-600 m.

6. ***What is general environment of deposition of the coal(s) in which the pseudovitrinite occurs?***

- Strandplain (back barrier)
- Fairly stable coastal swamps and smaller delta plain swamps
- Post-tectonic limnic basin (Neogene: Miocene-Oligocene).
- Deltaic.
- Different, mainly clays and sandstones and mudstones.
- The depositional environment was of limnic type: telematic - rush and rush-forest facies.
- Interdistributary bay; fluvial flood plain.
- River valley basins.
- Swamp forest zone.
- Bahia environment. Strong fresh water input.
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hanging wall	clay	clay	sandy clay	sandy clay	clay	gritty clay
footwall	clay	clay	sandy clay	sand	marl	sandstone

- Forest swamps.
- Wet swamp forest.
- Various.

7. ***Have coking or other tests been carried out*** *on any of these pseudovitrinite-bearing coals? If so please comment on the results*.

- Just working on it.
- Yes, resulted non-fused, isotropic coke.
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- No.
- Unfortunately not.
- No coking coals.
- No.
- Yes. Coals with higher content of pseudovitrinite reduce the coking strength character of the coals.
- I have carried out coking tests on both South African and Polish coals. At least substantial part of pseudovitrinite has been carbonised. (Poster on the ICCP Meeting in Heerlen).
- In pulverised fuel combustion test, yields were intermediate for HVB coals (85% Conversion). We did not attribute to pseudovitrinite their relatively poor combustion performance.
- They are made some coking tests on the Cozla Coal, but I think that is really difficult to know which is the influence of PSV because this coal has a medium Inertinite content (10%). However, this coal has the following features: SI= 61/2…. 7; AA: a=40; b=150. On the others coals (Lignites and Subbituminous coals) I have made grinding and combustion tests. I am not able to say how much high is the influence of PSV because: one hand, the PSV content is small and, on the other hand, the maceral analysis occurs as a complex composition of the Huminite Group. I also think that is very important to separate the PSV from coal (as pure PSV or as concentrate) and after the separation to be made all tests on this pure PSV.
- No coking tests no comments.
- Investigations on the petroleum generation potential of bituminous coals from the Saar region (the samples contained pseudovitrinite,). See Appendix 4 (Bibliography), Pickel and Gootz, 1991.
- No.
- Not specifically to assess effect of PV.

8. ***Have you observed any evidence for or against the possibility that pseudovitrinite features might be derived from sample exposure or preparation processes? If so please comment.***

- I have not observed any evidence for the possibility that pseudovitrinite features might be derived from sample exposure or preparation procedures.
- I do not think these subsequent processes are relevant to the origin of PSV.
-
- No.
- Rather not.
- Original pseudovitrinite features. Short time of the sample exposure and routine preparation of the specimen with no possible influence on coal features.
- Serrated particle edges formed during sample crushing.
- The samples studied are from deep cores and also from working mines. Identity of this maceral is established from thin and polished sections both studied in T.L. and R.L. respectively. Exposure or preparation possibility is non-existent.
- No.
- No. It appears to be independent from coal weathering.
- No.
- No.
- Against the possibility. Pseudovitrinite is so frequent in coals from the Saar-Basin that it hard to believe they are all caused by sample exposure or preparation.
- Yes and no.

9. ***Would you be able to provide***:
Samples or photographs of pseudovitrinite-bearing coal(s) for round-robin exercise? If so please indicate the type of material available.

- Suitable sample material stored at Geological Survey of Canada, Calgary location; also could provide micrographs from pellets made from Lower Cretaceous coals;
- Yes, only photographs,
- Only some photographs of PSV-bearing coals.
- No samples, no photographs.
- I cannot promise but I will try to provide the samples and photos from brown coals (Miocene age).
- Yes. Two photographs of pseudovitrinite *(are provided*).
- I may have enough samples for a round robin. Sample is crushed to -20 mesh from a channel sample. I have photographs.
- I do not visit mines now after my retirement from Govt. service. I am now nearing 70 years old. I have a large no of papers on Indiana coals to my credit.
- Samples of SA low rank bituminous coal. Please specify the amount searched. Photographs.
- Photographs.
- Raw coals, black/white photographs.
- Probably photographs, maybe also some samples, but it is not sure in that moment.
- Yes for samples, granulate <1 mm particulate block in resin; yes for photographs (see enclosed).
- -Photographs for sure, but I suspect, yours are better; samples from the Saar Basin possibly, but would depend on the amount.
- Samples from Afghanistan: four block sections possible.
- Possibly.
- Permian coals: grain mounts, polished blocks and small amount of raw coals.

10. ***Have you done or would you be able to perform any special tests or investigations on pseudovitrinite-bearing coal samples as part of an ICCP project? If so, please indicate what tests were done or what contribution to the project might be involved?***

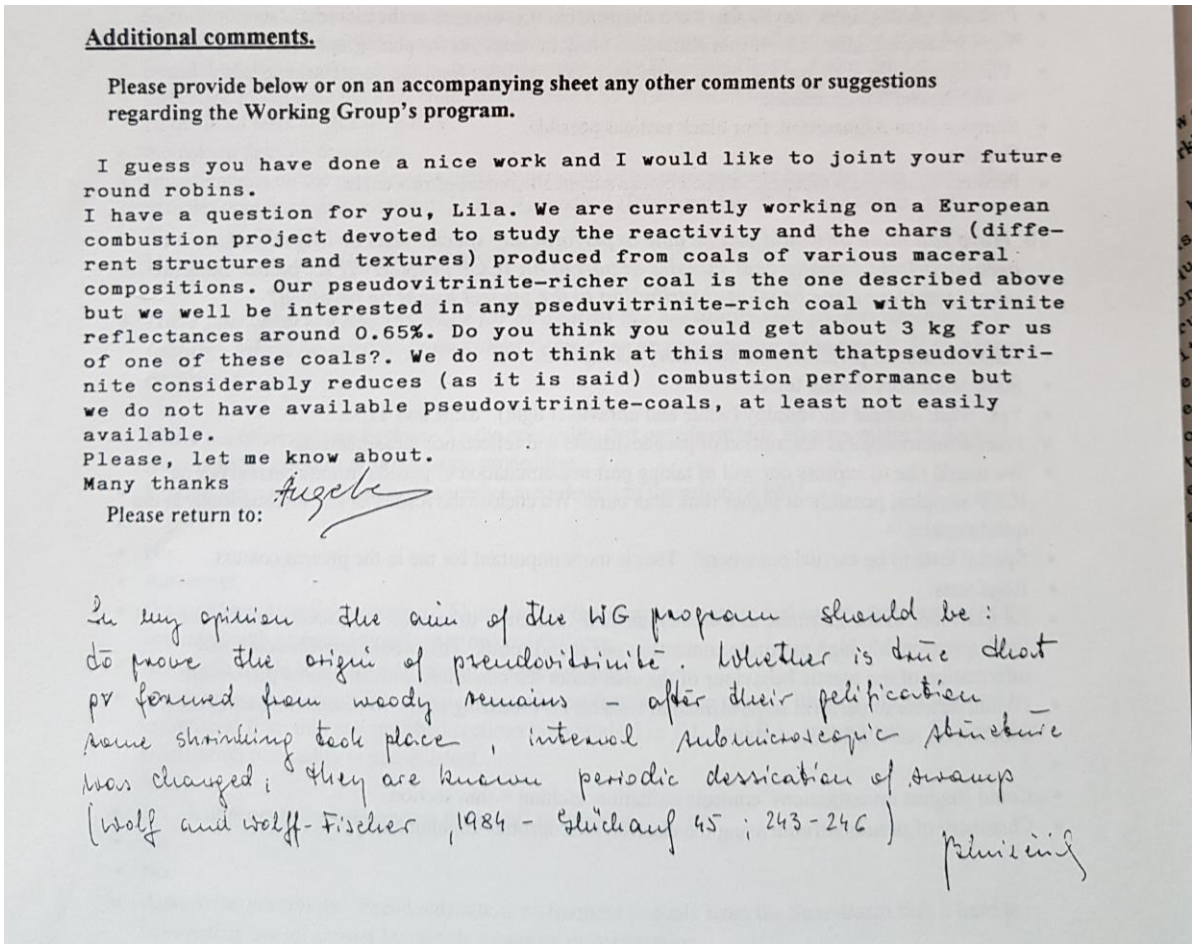
- I shall be able to perform some laboratory coking tests.
- Some laboratory coking tests.
- Yes. Test: optical microscopy (white and ultraviolet light). SEM and TEM.
- Precise microscopical description of pseudovitrinite and reflectance measurements.
- We would like to express our will of taking part in examination of pseudovitrinite carried out on ICCP samples, possibly of higher rank than ours. We enclose the results of our investigations in the questionnaire.
- Special tests to be carried out where? That is more important for me in the present context.
- Roga tests.
- As Convenor of the Inertinite in Combustion WG I can offer to include one pseudovitrinite rich coal (with a reasonably high inertinite content) in our round robin. This would provide additional information of the plastic behaviour of the coal under the conditions prevailing in a p.f. boil
- I could be able to perform some elemental tests on PSV-bearing coals: MV content; coking tests; combustion tests, grinding tests.
- ?
- Could suggest investigations: controls oxidation; etching + thin section.
- Chemistry of pseudovitrinite using the electron microprobe. Etching tests.

Would you like to participate in round robin exercise?

1. Angeles G. Borego

2. Brian J. Cardott
3. Wieslaw Gabzdyl / Bronislawa Hanak
4. Amalia Jimenez
5. Wolfgang Kalkreuth
6. Joachim Koch.
7. Krystyna Kruszewska
8. Barbara Kwiecinska
9. M.J. Lemos de Sousa/ M. M. Marques / D. Flores
10. Grzegorz Nowak
11. Georgeta Predeanu
12. Cornelia Panaitescu
13. H. S. Parek
14. Anca Ileana Penu
15. Walter Pickel.
16. Harold Read
17. Isabel Suarez-Ruiz

Additional comments.



Additional comments.

Please provide below or on an accompanying sheet any other comments or suggestions regarding the Working Group's program.

I guess you have done a nice work and I would like to joint your future round robins.
I have a question for you, Lila. We are currently working on a European combustion project devoted to study the reactivity and the chars (different structures and textures) produced from coals of various maceral compositions. Our pseudovitrinite-richer coal is the one described above but we well be interested in any pseduvitrinite-rich coal with vitrinite reflectances around 0.65%. Do you think you could get about 3 kg for us of one of these coals?. We do not think at this moment thatpseudovitrinite considerably reduces (as it is said) combustion performance but we do not have available pseudovitrinite-coals, at least not easily available.
Please, let me know about.
Many thanks
Please return to:

In my opinion the aim of the WG program should be: to prove the origin of pseudovitrinite. Whether is true that pv formed from woody remains - after their pelification some shrinking took place, internal submicroscopic structure was changed; they are known periodic dessication of swamps (Wolf and Wolff-Fischer, 1984 - Glückauf 45 ; 243-246)