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# ICCP

## COMMISSION II

## PSEUDOVITRINITE WORKING GROUP

(To be presented in Wellington, New Zealand: October 1997)

by
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Appendix 1. Questionnaire - Summary of Comments Received
Appendix 1, Part 2. Additional comments
Appendix 2. Back to the past. Historical survey of the work carried out by ICCP on pseudovitrinite (based on Harold Smith's archives).
Appendix 3. The results of exercises (1968-1970) performed according to Prado's method. Prepared by J.G. Prado.
Appendix 4. Bibliography

Gurba, L.W. and Ward, C.R., 1997. Pseudovitrinite. Progress Report for the International Committee for Coal and Organic Petrology, Commission II. Pseudovitrinite Working Group. 49th ICCP Meeting, Wellington, New Zealand, October 20-24, 1997. https://www.iccop.org/commissions/commission-ii/working-groups-ii/.

## INTRODUCTION

The Pseudovitrinite Working Group was re-activated at the last ICCP meeting in Heerlen, Holland to investigate further the nature and properties of the material referred to by Benedict et al. (1968) as pseudovitrinite.

The main objectives of the Working Group were presented in the report by Gurba and Ward (1996b), tabled at the meeting and published in the Minutes of the 48th ICCP Meeting in Heerlen.

The main activities identified for the Working Group in 1997 were outlined in a letter, circulated to the members of the Pseudovitrinite Working Group earlier this year. Following recommendations from Heerlen it was planned to compile an extended bibliography on pseudovitrinite, with input from those members who signed up to participate in the activities of the working group. Members were also asked to submit samples and photographs of coals containing pseudovitrinite, from various geological ages and settings.

## QUESTIONNAIRE

A questionnaire was sent out to the 18 Members of the Pseudovitrinite Working Group in January 1997, seeking their comments on Working Group objectives, the availability of samples and willingness to participate in any future exercises.

To date, 17 Members and non-Members have replied. Comments from the questionnaire are summarised in Appendix 1. Encompassed in Appendix 1 are also copies of letters from non-Members of Pseudovitrinite Working Group that contain ideas on other directions, which the Working Group may consider.

Also included in Appendix 1 is a letter from L. Benedict, strongly supporting the working groups program for the study of pseudovitrinite.

It can be concluded from the returns that there is a wide geographic distribution of coals containing pseudovitrinite. Pseudovitrinite is reported from both the Northern and Southern Hemispheres. It has been reported in Carboniferous, Permian, Jurassic, Cretaceous and Tertiary coals. No pseudovitrinite has been reported from Triassic coals.

Pseudovitrinite has been observed mainly in high-volatile and medium-volatile bituminous coals, although it is also reported from lower (R=0.29-0.39%) and higher rank coals (Rmax=3.86%). The majority of the coals reported are vitrinite-rich however, inertinite-rich coals containing pseudovitrinite are also recorded.

The pseudovitrinite-bearing materials are mainly from active mines, the depth involved being up to 600 meters below the ground surface. Many are from drill cores, with reported depth ranges up to 1000 metres. Pseudovitrinite is identified in plant-feed samples. It is also reported (less frequently) from outcrops and cuttings.

### *Fracture pattern*

Answering the question as to whether pseudovitrinite **features might be derived from sample exposure** or preparation processes, 14 members replied definitely NO.

It was also reported that serrated particle edges are formed during sample crushing (Cardott) and that fracture patterns can be induced by sample preparation (Smith). If excess pressure is avoided in making the block however, the number of fractured particles is greatly reduced and so is the number of pseudovitrinite particles assessed on this criterion alone.

According to Benedict et al. (1968) pseudovitrinoid tends to be more brittle than vitrinoid and frequently contains fractures (dendritic or brecciated fractures, serrated fractures on particle edges, wedge-shaped fractures and relief fractures). These fractures, according to Benedict et al. (1968), can be induced in part during sample preparation, but even so are selectively associated with pseudovitrinite.

Although the mechanism of formation of pseudovitrinite is still under investigation, various environments of deposition have been reported for pseudovitrinite-bearing coals (Appendix 1). If pseudovitrinite is inherent in coal seams, more research should be done on this topic.

## SAMPLES

The following members indicated a willingness to provide samples for a round-robin exercise and further investigation:

| | Age, location |
|---|---|
| Brian J. Cardot | |
| Lila Gurba | Permian, Australia |
| Wolfgang Kalkreuth | Canada |
| Joachim Koch | Afghanistan, Jurassic |
| Krystyna Kruszewska | Permian, South Africa |
| Barbara Kwiecinska | Poland |
| Anca Penu | |
| Walter Pickel | Carboniferous, Saar Basin |
| Harold Read | Permian, Australia |
| Lemos de Sousa | |

We would also appreciate any New Zealand samples.

## PHOTOMICROGRAPHS

The request for photomicrographs showing pseudovitrinite resulted in donation of an extensive data base from Harold Smith, some samples from Joachim Koch which were subsequently photographed, and few photographs from members of Pseudovitrinite Working Group. These will be tabled at the meeting.

Our photographic database now contains the following examples from different sequences:
TABLE 1.

| Location | Age |
|---|---|
| Gunnedah Basin<br>Australia | Early and Late Permian |
| Bowen Basin<br>Australia | Permian |
| Sydney Basin<br>Australia | Permian |
| England | Carboniferous |
| Afghanistan | Jurassic |
| Germany | Carboniferous |
| Poland | Carboniferous |
| Spain | |
| | |

The Convenors have begun to compile an “atlas” of pseudovitrinite from photomicrographs in their possession as well as from published data. However, we need a large amount of additional material from Working Group Members.

Photographs should be accompanied by information (if possible) on the locations, age of the coal, and the reflectance of telocollinite and pseudovitrinite.

The photographs we collect will help to establish the selection criteria for distinguishing pseudovitrinite from other vitrinites.

## BIBLIOGRAPHY

There have been a few additions to the list the list presented by the Convenors last year, but, more input is needed from Working Group Members if a complete listing is to be achieved. All information on references related to pseudovitrinite is welcome. A copy of the list to date is included as Appendix 4.

## ROUND ROBIN EXERCISE

A Round Robin exercise is scheduled for the coming year. After receiving specimens from the members who indicated availability (see list above), samples will be prepared for reflectance determinations (and other examinations). The previous Pseudovitrinite Working Group performed this exercise (1966-1970) but the results were confusing (Appendix 2).

We will prepare the samples as polished blocks and grain mounts, asking the Members to determine the level of maturity as normal routine reflectance determination. Each laboratory will have access to the sample and sample information for a period of two weeks, and will then be expected to pass all material to the next laboratory on the distribution list. Members unable to complete the required analysis in their allotted time should pass the material to the next laboratory.

Attached in Appendix 1 is a list of Members willing to take part in this exercise.

Samples in which pseudovitrinite is identified by the majority of examiners will be forwarded for the next investigation phase.

All comments and suggestions should be forward to the Convenors before the end of January 1998.

## NEW MEMBERS

New members to this Working Group are welcome and should contact the Convenors. Attached is the updated list of members of the Pseudovitrinite Working Group.

## PROPOSED ACTIVITY FOR 1997/98

- Develop a sample bank for individual researchers to use.
- Round robin exercise for rank determination and maceral composition.
- Tests
    1. Etching different samples representing different ages and geological settings.
    2. Evaluation of thin sections.
    3. Study the chemistry of macerals of the vitrinite group
    4. Carry out coking tests.
- Compilation of individual contributions

The Convenors will contact those members who expressed in the Questionnaire their willingness to participate in these activities. Any comments and other suggestions are welcome.

**PROBLEMS TO BE SOLVED.**

- Use of the name 'pseudovitrinite' in general and in publications in particular.
- Determination of the chemistry of macerals of the vitrinite group.
- Further study of the origin of pseudovitrinite.
- Determination of the technological properties.
  Confusing results have been reported regarding coking behaviour of the coals containing pseudovitrinite. (Appendix 1, Appendix 2, Benedict et al. (1968), Thompson and Benedict (1974),

Because the previous Pseudovitrinite Working Group did much work on reflectance determination and maceral composition of coals containing pseudovitrinite (see Appendix 2 and 3) we suggest not repeating a great deal of work along this line of activity.

This report will be circulated during the 49th ICCP Meeting in Wellington. Those members, who are involved in the activity of Pseudovitrinite Working Group and do not attend the meeting, will also receive the report. Corrections and/or additions from members who did not attend the meeting in Wellington may be sent to the Convenors. All comments and suggestions will be considered by the Convenors before the final programme for 1998 is set up.

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**Pseudovitrinite Working Group - MEMBERS**

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