
**Methods for the petrographic analysis
of coals —**

**Part 1:
Vocabulary**

*Méthodes d'analyse pétrographique des charbons —
Partie 1: Vocabulaire*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 5, *Methods of analysis*.

This third edition cancels and replaces the second edition (ISO 7404-1:1994), which has been technically revised.

ISO 7404 consists of the following parts, under the general title *Methods for the petrographic analysis of coals*:

- *Part 1: Vocabulary*
- *Part 2: Method of preparing coal samples*
- *Part 3: Method of determining maceral group composition*
- *Part 4: Method of determining microlithotype, carbominerite and minerite composition*
- *Part 5: Method of determining microscopically the reflectance of vitrinite*

Introduction

Petrographic analyses have been recognized internationally as important in the context of the genesis, vertical and lateral variation, continuity, metamorphism and usage of coal. The International Committee for Coal and Organic Petrology (ICCP) has made recommendations concerning nomenclature and analytical methods and has described in detail the characteristics of a wide range of coals^{[3][4][5]}. The text of this part of ISO 7404 agrees substantially with the text of the relevant ICCP publications and incorporates many useful comments made by members of the ICCP and by member bodies of ISO/TC 27, *Solid mineral fuels*.

Petrographic analyses of a single coal provide information about the rank, the maceral and microlithotype compositions and the distribution of minerals in the coal. The reflectance of vitrinite is a useful measure of coal rank and the distribution of the reflectance of vitrinite in a coal blend, together with a maceral group analysis, can provide information about important chemical and technological properties of the blend.

ISO 7404 is concerned with the methods of petrographic analysis currently employed in characterizing coal in the context of its technological and/or geological use. It establishes a system for petrographic analysis and comprises five parts, as follows:

- Part 1: Vocabulary;
- Part 2: Method of preparing coal samples;
- Part 3: Method of determining maceral group composition;
- Part 4: Method of determining microlithotype, carbominerite and minerite composition;
- Part 5: Method of determining microscopically the reflectance of vitrinite.

The definitions given are intended for use solely in connection with the generally accepted international methods of petrographic analysis of coal described in the other parts of ISO 7404.

The petrographic terms listed herein are those used by the ICCP and ISO. They do not include terms such as, for example, pseudovitrinite, semi-vitrinite and semi-inertinite which refer to types of maceral with particular properties, but which are sometimes difficult to define. Such terms may be considered important for specific applications, but their wider use is not recommended.

Methods for the petrographic analysis of coals —

Part 1: Vocabulary

1 Scope

This part of ISO 7404 defines terms that are used in connection with both maceral and microlithotype analyses, and with the determination of the reflectance of vitrinite. It applies to the terms used in the examination of coal of all ranks.

This part of ISO 7404 is not intended to be a comprehensive glossary of coal petrographic terminology, nor does it attempt to provide sufficient information to allow recognition of all the coal components described. Further information may be obtained from the relevant ICCP publications^{[3][4][5]}.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 General terms

2.1.1 coal

combustible sedimentary rock formed from bio- and geochemically altered plant remains (peat) consolidated under superimposed strata

Note 1 to entry: The characteristics of different coals are due to differences in source plant material, in the conditions and the degree of change that the material has undergone in its geological history and in the range of impurities present. Coal composition can be characterized microscopically by maceral and microlithotype compositions.

2.1.2 coalification

process by which sedimented plant remains are transformed into *coal* (2.1.1)

Note 1 to entry: This process is characterized by an increase in the carbon content in the plant remains and a decrease in the yield of volatile matter from the plant remains. As coalification proceeds, the *reflectances* (2.2.1) of the *macerals* (2.3.1) increase. Vitrinite is used as a reference material for the determination of the *rank* (2.1.3) of coal because its reflectance increases uniformly with the extent of coalification.

2.1.3 rank

position of a *coal* (2.1.1) in the *coalification* (2.1.2) series from *low rank coal* (2.1.4) to *high rank coal* (2.1.6), indicating maturity in terms of chemical and physical properties

2.1.4 low rank coal

coals (2.1.1) of low rank that, in their natural state, are characterized by high inherent moisture content, high volatile matter content, low calorific value and a low vitrinite reflectance

Note 1 to entry: Low rank coals were formerly often referred to as lignite (now low rank A and B) and subbituminous coal (now low rank C). Regionally, also terms like brown coal were used for coals with a vitrinite reflectance below 0,5 % R_r.

Note 2 to entry: They are non-agglomerating.