International

ISO 7404-4

Coal — Methods for petrographic analysis —

Part 4: Method of determining microlithotype, carbominerite and minerite composition

Charbon — Méthodes d'analyse pétrographique —

Partie 4: Méthode de détermination de la composition en microlithotypes, carbominérites et minérites

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 5, *Methods of analysis*.

This third edition cancels and replaces the second edition (ISO 7404-4:2017), which has been technically revised.

The main changes are as follows:

— input from the International Committee for Coal and Organic Petrology (ICCP) has been added.

A list of all parts in the ISO 7404 series can be found on the ISO website.

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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 described in detail the characteristics of a wide range of coals [1][2][3][4][5][6].

Petrographic analyses of a single coal provide information about the rank, the maceral and microlithotype compositions and the distribution of mineral matter 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 some important chemical and technological properties of the blend.

The ISO 7404 series is concerned with the methods of petrographic analysis currently employed in characterizing coal in the context of its technological or geological use or both. It establishes a system for petrographic analysis.

Microlithotypes are the naturally occurring associations of macerals which characterize the microscopically visible different types of coal. By convention, the identity of a microlithotype is determined by the maceral group or groups occurring within an area of at least 50 µm × 50 µm and which are present in amounts equal to or exceeding a volume fraction of 5 %. Hence, they can comprise a single maceral or maceral group if it exceeds these dimensions. Microlithotypes may include up to 20 % by volume fraction of minerals such as clay, quartz and carbonates or up to 5 % by volume fraction of sulfide minerals. If the volume fraction of mineral matter exceeds these amounts, the material is designated as minerite or carbominerite depending on the proportions of coal and mineral matter.

Carbominerites can be subdivided according to the type of mineral matter.

Microlithotypes contribute information on the genesis of coal seams and can assist in solving problems of seam correlation. Because they determine, together with rank and mineral matter, the hardness and density of the bulk coal substance, microlithotypes affect the behaviour of coal in mining and coal preparation processes. The different microlithotypes determine, under given geological conditions, the distribution of micro-cracks and to some extent the cleat in the coal. The results of maceral analyses can be interpreted more meaningfully from a knowledge of microlithotype composition. Such information can assist in explaining the behaviour of coal in commercial and experimental utilization processes where the association of macerals is known to be important.

NOTE 1 The volume fraction expressed as a per cent of carbonate, clay and quartz minerals on the one hand and sulfide minerals on the other, which define the carbominerites and minerites, correspond to the densities which separate acceptable coal from middlings (1,5 g/cm^3) and from rejects in coal preparation.

NOTE 2 A cleat in coal refers to the naturally occurring orthogonal joints in coal. Cleats occur as two perpendicular sets of fractures.