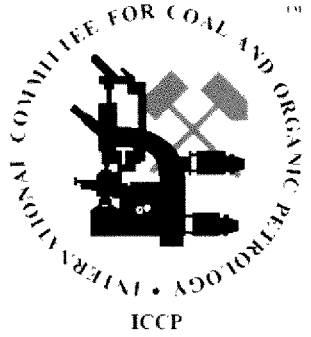
Petrological and geochemical studies of lignite from the Tamnava West field, Kolubara basin (Serbia)

Milena Pajić, Reinhard F. Sachsenhofer, Achim Bechtel, Ksenija Stojanović, Vladimir Krstić, Dragana Životić



International Committee for Coal and Organic Petrology

72nd Annual ICCP Meeting

19th-25th September 2021, Czech Republic

Coal and Organic Petrology in the Era of Transition from Fossil to Renewable Fuels

CONFEREN

PETROLOGICAL AND GEOCHEMICAL STUDIES OF LIGNITE FROM THE TAMNAVA WEST FIELD, KOLUBARA BASIN (SERBIA)

Milena Pajić[1], Reinhard F. Sachsenhofer[2], Achim Bechtel[2], Ksenija Stojanović[3], Vladimir Krstić[4], Dragana Životić[4]

[1] *Zijin Copper, Svetog Save 2, 19250 Majdanpek, Serbia*

[2] *Department Angewandte Geowissenschaften und Geophysik, Montanuniversität Leoben, Peter-Tunner-Str. 5, A-8700 Leoben, Austria*

[3] *University of Belgrade, Faculty of Chemistry, Studentski trg 16, 11000 Belgrade, Serbia*

[4] *University of Belgrade, Faculty of Mining and Geology, Djusina 7, 11000 Belgrade, Serbia*

* *Corresponding Author: Dragana Životić (dragana.zivotic@rgf.bg.ac.rs)*

Abstract

Lignite from the Tamnava West field, Kolubara basin (Serbia) was investigated using micropetrography, proximate and ultimate analyses and biomarker proxy. Upper Miocene (Pontian) coal-bearing strata consist of sandy-clayey sediments with three coal seams. The twenty four (24) representative samples originating from borehole PE/Pgh-127.5 from the main coal seam (depth interval 60.3-88.2 m) were analysed.

Coal from the Tamnava West field is typical humic coal with high huminite, lower liptinite and low inertinite content. Textinite, ulminite and attrinite are the most abundant huminite macerals. Liptodetrinite, sporinite and suberinite are the most abundant liptinite group macerals, whereas inertodetrinite and fusinite are predominant inertinite macerals.

Organic carbon content (C_{org}) varies in wide range from 25.52 to 61.21 %, while total sulphur content varies between 0.10 to 4.43 %. The yield of the extractable organic matter (bitumen) is high with sharp domination of asphaltenes and polar-NSO compounds in bitumen (>91 %) implying the high proportion of biogenic and diagenetic compounds expectable for immature terrestrial organic matter (OM).

Diterpenoids are the main constituents of saturated fractions with variable amount of *n*-alkanes and hopanoids. Content of sesquiterpenoids, triterpenoids and steroids in saturated fractions is low. Aromatic fraction is characterised by high content of triterpenoids with variable amount of diterpenoids. The 16α(H)-phyllocladane and pimarane are dominant biomarkers in the saturated fraction of all investigated samples, whereas simonellite, dehydroabietane and retene are major diterpenoid constituents of aromatic fraction. Only des-A-degraded triterpenoids are present in the saturated fraction in a low amount, while mono- and threearomatic triterpenoids are much more abundant in the aromatic fraction.

Maceral composition and distribution of biomarkers of lignite from Tamnava West field indicate high contribution of gymnosperm with variable contribution of angiosperms in

precursor OM. Significant aromatisation of triterpenoids during diagenesis with microbial activity is also present in Tamnava West lignite implying the changes of water column level resulted in slight variations of redox settings and pH during peat stage.