ABSTRAK

Arang Batu Formasi Tanjong berusia Tertiari yang berada di blok tengah barat Pinangah, bahagian selatan Sabah dianalisis berdasarkan teknik petrologi organik dan geokimikal organik. Sediman di Tanjong Formasi diendapkan dalam sekitaran air payau berdasarkan data yg diperolehi daripada biostratigraphi analisis (Collenette, 1965). Arang batu Tanjong Formasi adalah bersifat humik dan umumnya didominasi oleh makeral vitrinit, liptinit dan sedikit kuantiti inertinit. Kandungan jumlah karbon organik ialah daripada 51.2 sehingga 77.7 wt%, dan nilai pengeluaran bitumen ialah daripada 57300 hingga 140000 ppm, iaitu mencapai tahap minimum batuan sumber dan juga berpontensi cemerlang sebagai generatif hidrokarbon. Arang batu Tanjong Formasi mempunyai potensi generatif yang baik sebagai cecair hidrokarbon berdasarkan kandungan liptinit (>15%). Ini disokong oleh indeks hidrogen yang tinggi iaitu melebihi 300 mg HC/g TOC, selaras dengan kerogen Jenis II dan campuran Jenis II-III. Sampel arang batu mempunyai nilai pantulan vitrinit iaitu dari 0.42%-0.66 Ro%, dan ini menunjukkan arang batu Tanjong Formasi kurang matang hingga awal matang untuk generatif hidrokarbon. Nilai pantulan vitrinit ini juga menunjukkan arang batu Tanjong Formasi adalah dari sub-bituminus B-A dan tinggi wap bituminous C. Nilai Tmax ialah dari 419°C to 451°C dan selaras dengan data dari pantulan vitrinit. Ini juga disokong oleh parameter kematangan biomarker iaitu oleh C_{32} homohopan. Pecahan tepu arang batu Tanjong Formasi dicirikan dengan didominansi nombor ganjil karbon n-alkana (n-C_{23} to n-C_{33}), tinggi nisbah Pr/Ph tinggi (8–18), tinggi nisbah Tm/Ts (6–28), dan kandungan utama C_{29} steran. Polen yang hadir dalam sampel arang batu ialah *Rhizophora, Cassuriana*, *Dactylocdalus* and *podocarpus.* Diagram indeks pengawetan berlawanan indeks gelifikasi menunjukkan sampel arang batu diplotkan dalam sekitaran paya terbuka sehingga sungai dalam kawasan dataran delta rendah. Ini disokong oleh keputusan

palinologi. Semua parameter biomarker dan keputusan palinologi menunjukkan kandungan organik adalah berasal dari terrestrial dan dienapkan di bawah pengaruh marin diantara kondisi suboxic dalam delta rendah.

ABSTRACT

The Tertiary Tanjong Formation coals exposed in the west middle block of the Pinangah Coalfield, central part of southern Sabah were analysed based on organic petrological and organic geochemical methods. The sediments of the Tanjong Formation were deposited in brackish water condition, based on limited biostratigraphic data (Collenette, 1965). The Tertiary Tanjong coals are humic and generally dominated by vitrinite, with significant amounts of liptinite and low amounts of inertinite macerals. Total organic carbon contents (TOC) of the coals range from 51.2 to 77.7 wt. %, and yield of bitumen values ranging from 57300 to 140000 ppm, which meet the standard as a source rock with excellent hydrocarbon-generative potential. Good liquid hydrocarbons generation potential can be expected from the Tanjong coals based on significant liptinitic content (> 15%). This is supported by their high hydrogen index up to 300 mg HC/g TOC, consistent with Type II and mixed Type II-III kerogen. The coal samples have vitrinite reflectance values in the range of 0.42%-0.66 Ro%, indicating immature to early mature stage for hydrocarbon generation. These vitrinite reflectance values also indicated that the Tanjong coals are within sub-bituminous B-A and high volatile bituminous C rank. Tmax values ranging from 419°C to 451°C are in good agreement with the vitrinite reflectance data. This is supported by biomarker maturity parameters as suggested by the C_{32} homohopane. The saturated fraction of the Tanjong coals are characterized by dominant odd carbon numbered n-alkanes (n-C_{23} to n-C_{33}), high Pr/Ph ratios (8–18), high Tm/Ts ratios (6–28), and predominant of C_{29} regular sterane. *Rhizophora, Cassuriana*, *Dactylocdalus* and *podocarpus* are the types of pollen present in the analysed coal samples. Preservation Index versus Gelification Index facies diagram show coal samples fall within the depositional open marsh to fluvial environment on the lower delta plain field. This is supported by

palynology result. All biomarker parameters and palynology result clearly indicate that the organic matter were derived from terrestrial inputs and deposited under marine influenced within suboxic condition on the lower delta plain.

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ACKNOWLEDMENT

First of all I want to praise to our creator Allah S.W.T for his mercy and guide to finish up my thesis during the time of my research. Many thank to my parents for their trust and moral support during the time of my study.

The author would also like to thank Prof Wan Hasiah Abdullah, Dr Ralph L. Kugler and Dr Mohammed H. Hakimi for all their generous supervision and patience over the last two years. I also would like to thank Dr M.Pearson for his valuable comments. Special thank to staff of Jabatan Mineral & Galian (JMG) Sabah for provide a transport, accommodation, facilities and guidance during the fieldtrip at the research study area.

Support receive from all the laboratory assistant staff of the University of Malaya geochemistry and petrology lab, are very much appreciate. To my friends, Mohd Harith Azhar, Mohd Fadzly Mislan and Patrick Gou thanks a lot for everything during all of this time.

Finally, many thank to University of Malaya for giving me this opportunity to continue my study for the Master of Science and also providing Research Grant No PS363 2009c.