

ABSTRAK

Penelitian dilakukan di Formasi Muara Enim Cekungan Sumatera Selatan yang merupakan salah satu target eksplorasi Gas Metana Batubara (GMB) di Indonesia. Salah satu aspek yang mempengaruhi keekonomian suatu lapangan GMB adalah nilai permeabilitas batubara. Permeabilitas akan sangat dikontrol oleh sistem *cleat* yang berkembang pada lapisan batubara tersebut. Berdasarkan hal tersebut, tujuan penelitian ini adalah untuk mengetahui hubungan antara karakteristik batubara, sistem *cleat* yang berkembang dan nilai permeabilitasnya. Metode yang digunakan meliputi pengukuran atribut *cleat* di lapangan dan analisis laboratorium. Pengukuran atribut *cleat* dilakukan menggunakan metode window scan pada 16 lokasi pengukuran yang tersebar pada 3 lapisan batubara, yaitu A1, A2, dan B1. Atribut *cleat* yang diukur adalah orientasi, panjang, apertur, dan *cleat* spacing. Analisis laboratorium terdiri dari analisis proksimat, analisis petrografi, dan nilai *calorific value*. Perhitungan nilai permeabilitas berdasarkan atribut *cleat* menggunakan rumus Robertson dan Christiansen (2006) dan Lucia (1983). Karakteristik batubara pada daerah penelitian menunjukkan kandungan kadar lengas berkisar 26 – 30,5 % (ar), abu 1,1 – 2,5 % (adb), zat terbang 40 – 43,5 % (adb), karbon tertambat 41,3 – 47 % (adb) dan nilai *calorific value* 5773 – 6092 cal/gr (adb). Peringkat batubara adalah Subbituminus A. Orientasi *cleat* berarah timur laut – barat daya dengan rata-rata panjang *cleat* 23,89 cm – 46,87 cm, apertur 0,0343 – 0,067 cm dan spacing 2,48 – 4,57 cm. Nilai permeabilitas berdasarkan formula Robertson dan Christiansen (2006) berkisar 90,33 – 1020 Darcy. sedangkan berdasarkan formula Lucia (1983) berkisar 2,069 – 45,8192 Darcy. Hasil perhitungan menunjukkan lapisan batubara A2 memiliki nilai permeabilitas tertinggi dan B1 memiliki permeabilitas terendah. Nilai permeabilitas akan berbanding lurus dengan nilai apertur, panjang dan densitas *cleat* namun berbanding terbalik dengan *cleat* spacing. Material pengisi *cleat* terdiri dari silika, amber, dan pirit.

Kata penting : *cleat*, permeabilitas, batubara, GMB

ABSTRACT

The study was conducted in Muara Enim Formation, South Sumatra Basin, which is one of the targets of CoalBed Methane (CBM) exploration in Indonesia. One of the aspects that affect the economic factor of CBM is coal permeability. This permeability will be controlled by cleat system developing within the coal seams. Thus, the purposes of this study are to determine the relation between the characteristic of coal, cleat system, and permeability. The research methods that were used include cleat attribute measurement and laboratory analyses. Cleat attribute measurement was done by using the window scan methods at 16 sites that were spread over 3 coal seams, called A1, A2, and B1. Measured factors of the cleat attributes are consist of the orientation, length, aperture, and cleat spacing. Meanwhile, laboratory analyses consist of proximate, petrography, and calorific value analyses. The calculation of permeability value based on cleat attribute were using the formulas of Robertson and Christiansen (2006) and Lucia (1983). The coal characteristics of the study area showed the moisture content vary from 26 – 30.5 % (ar), ash content 1.1 – 2.5% , volatile matter 40 – 43.5%, fixed carbon 41.3 – 47% (adb), and calorific value 5773 - 6092. The coal rank is Subbituminous B. The orientation of cleat is northeast-southwest trend, averaging 23.89 cm - 46.87 cm of length, 0.0343 – 0.067 cm of aperture, and 2.48 – 4.57 of cleat spacing. Permeability values based on the formula of Robertson and Christiansen (2006) range from 90.33 to 1020 Darcy, while based on Lucia (1983), the grade is vary from 2.069 – 45.8192 Darcy. The calculation result showed that A2 coal seam has the highest permeability value, while B1 has the lowest. This permeability value will be directly proportional with aperture value, length and cleat density, but will be inversely proportional with cleat spacing. The materials that filled the cleats contain silica, amber, and pyrite.

Keywords: cleat, permability, coal, CBM