

SARI

Persebaran bentonit di Dusun Biting, Desa Pelem, Kecamatan Pringkuku, Kabupaten Pacitan, Jawa Timur cukup luas dan mudah dijangkau dan dapat dimanfaatkan dalam bidang industri (Winarno, 2004). Bentonit adalah lempung kristalin yang terbentuk melalui proses devitrifikasi dan perubahan komposisi kimia material gelas berupa tuf atau debu vulkanik (Murray, 1997). Sebagian besar bentonit ditambang oleh warga dan dijual kepada kontraktor dengan nilai jual yang rendah. Penelitian ini bertujuan mempelajari karakteristik dan pemanfaatan bentonit untuk meningkatkan nilai jual. Terdapat 21 titik pengambilan sampel di lokasi penelitian dan 6 dari 21 titik pengambilan sampel dipilih berdasarkan variasi litologi dan ketebalan singkapan. Lokasi pengambilan sampel termasuk ke dalam Formasi Jaten dan Formasi Wuni dengan satuan batulempung. Analisis petrografi menunjukkan bahwa batuan mengandung mineral lempung, feldspar, kuarsa, oksida besi, dan gelas vulkanik. Mineral lempung diinterpretasikan sebagai bentonit yang terbentuk melalui hasil ubahan gelas vulkanik. Analisis XRD menunjukkan bahwa bentonit mengandung smektit, kaolinit, klorit, kuarsa, pirit, plagioklas, k-feldspar, dan hematit dengan kandungan smektit yang dominan. Komposisi kimia smektit dianalisis dengan XRF dan EDX. Komposisi kimia smektit hasil XRF yaitu Na_2O <0,01 – 0,53%, MgO 1,02 – 7,16%, Al_2O_3 9,52 – 34,77%, SiO_2 18,47 – 64,17%, P_2O_5 0,08 – 0,25%, K_2O 0,15 – 2,99%, CaO 0,15 – 2,97%, TiO_2 0,02 – 1,39%, Fe_2O_3 4,32 – 63,43%, dan MnO 0,01 – 0,2%. Komposisi kimia smektit yang paling tinggi adalah silika (SiO_2) dan alumina (Al_2O_3). Komposisi kimia smektit hasil EDX diantaranya O 46,04 – 49,23%, Mg 1,5 – 2,27 %, Al 11,35 – 16,72%, Si 25,38 – 28,35%, Ca 1,57 – 3,73%, Ti 0,75 – 1,02%, Fe 2,6 – 11,36%, dan K 0,5 – 1,6%. Kandungan unsur yang paling tinggi adalah oksigen, silika, dan alumina. Berdasarkan XRF dan EDX maka Bentonit Biting termasuk ke dalam kelompok Ca-bentonit seri beidelit. Bentonit Biting menunjukkan tekstur *cornflake* berupa lembaran-lembaran pada analisis SEM. Smektit memiliki kapasitas pertukaran ion yang rendah sebesar $\pm 22,33$ meq/100gr dan standar deviasi sebesar 1,84. Berdasarkan mineralogi, karakteristik kimia, dan karakteristik fisik, bentonit Biting berasal dari devitrifikasi dan alterasi hidrotermal. Bentonit Biting dapat dimanfaatkan dalam industri pembuatan anggur, minyak kelapa sawit, dan keramik dengan pengujian sifat fisik yang lebih lanjut.

Kata kunci: Biting, bentonit, smektit/montmorilonit, devitrifikasi, dan alterasi hidrotermal

ABSTRACT

Bentonite are widely distributed and easy to be reached in Biting, Pelem Village, Pringkuku District, Pacitan Regency, East Jawa and can be used in industry (Winarno, 2004). Bentonite is crystalline clay which formed through the process of devitrification and chemical composition changing of clay material from tuff or volcanic ash (Murray, 1997). Most of bentonite is mined by residents and sold to contractors with lower price. This research is conducted to investigate the characteristics and utility of bentonite in order to gain higher price. There are 21 sampling points at the study location. Six of them were selected based on lithology variations and thickness of outcrops. Sampling locations were classified to Jatén and Wuni formation with claystone unit. Petrographic analysis showed that these rocks contain clay mineral, feldspar minerals, quartz, iron oxide, and volcanic glass. Clay minerals were interpreted as a change in volcanic glass. They contained smectite, kaolinite, chlorite, cristobalite with the dominant smectite content, based on XRD analysis. The chemical composition of smectite was analyzed by XRF and EDX. Its chemical compositions were Na_2O <0.01 - 0.53%, MgO 1.02 - 7.16%, Al_2O_3 9.52 - 34.77%, SiO_2 18.47 - 64.17%, P_2O_5 0.08 - 0.25%, K_2O 0.15 - 2.99%, CaO 0.15 - 2.97%, TiO_2 0.02 - 1.39%, Fe_2O_3 4.32 - 63.43%, and MnO 0.01 - 0.2%. The highest chemical composition of smectite was silica (SiO_2) and alumina (Al_2O_3). The chemical composition of the smectite EDX results include O 46.04 - 49.23%, Mg 1.5 - 2.27%, Al 11.35 - 16.72%, Si 25.38 - 28.35%, Ca 1.57 - 3.73%, Ti 0.75 - 1.02%, Fe 2.6 - 11.36%, and K 0.5 - 1.6%. The highest element content was oxygen, silica, and alumina. Based on XRF and EDX, Biting Bentonite classified in Ca-bentonite beidellite series. Biting bentonite showed cornflake texture on SEM analysis. Cation exchange capacity of smectite-montmorillonite was ± 22.33 meq/100gr and its standard deviation is 1.84. Based on mineralogy, chemical characteristics, and physical characteristics, montmorillonite originates from devitrification and hydrothermal alteration. Montmorillonite can be used in the wine making, palm oil, and ceramics industries by testing further physical properties.

Keyword: Biting, bentonite, smectite/montmorillonite, devitrification, and hydrothermal alteration.