

ABSTRAK

PENGARUH VARIASI SUHU *SINTERING* DAN TEKANAN TERHADAP PEMBENTUKAN KERAMIK GERABAH BERBAHAN TANAH LIAT DAN *SLAG BOILER*

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Keramik gerabah merupakan salah satu contoh dari keramik tradisional. Dalam proses pembuatannya dilakukan pemanasan pada suhu tinggi. Kualitas keramik gerabah dipengaruhi oleh suhu *sintering*. Bahan pembuatan keramik gerabah terdiri dari tanah liat sebesar 75% dan slag sebesar 25%. Bahan dilakukan penghalusan dengan ukuran lolos 100 *mesh*. Lalu dicampur dan dibentuk badan keramik. Proses sintering dilakukan pada suhu 700°C, 800°C, dan 900°C dengan waktu tahan selama 3 jam. Dilakukan pengujian terhadap sampel keramik gerabah, pengujian sampel terdiri dari uji kuat tekan, uji densitas, uji porositas, uji absorptivitas. Sampel terbaik diperoleh pada suhu 900°C yang ditekan menggunakan mesin press dengan nilai kuat tekan 20,16 MPa, absorptivitas 9,5%, porositas 20,44% dan densitas 2,15 g/cm³. Berdasarkan hasil uji kuat tekan tertinggi maka dilakukan karakterisasi menggunakan alat XRF, XRD dan SEM-EDS. Hasil karakterisasi sampel menggunakan XRF menunjukkan keramik gerabah didominasi oleh senyawa SiO₂, Al₂O₃ dan Fe₂O₃. Hasil karakterisasi sampel menggunakan XRD terlihat fasa yang terbentuk pada keramik gerabah adalah *Silicon Oxide* (SiO₂), *Anorthite* (Al₂Ca₀₈Si₂) dan *Wustite* (Fe_{1.98}O₂). Selain itu, hasil karakterisasi sampel menggunakan SEM-EDS menunjukkan unsur Si dan Al yang paling mendominasi.

Kata Kunci: Keramik gerabah, suhu sintering, tekanan, tanah liat, *slag boiler*.

ABSTRACT

THE EFFECT OF *SINTERING* TEMPERATURE AND PRESSURE VARIATIONS ON THE FORMATION OF CLAY POTTERY CERAMICS AND *BOILER SLAG*

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Pottery ceramics are one example of traditional ceramics. In the manufacturing process is carried out heating at high temperatures. The quality of pottery ceramics is affected by *the sintering* temperature. The material for making pottery ceramics consists of clay by 75% and slag by 25%. The material is smoothed with a pass size of 100 *mesh*. Then mixed and formed ceramic body. The sintering process is carried out at temperatures of 700°C, 800°C, and 900°C with a holding time of 3 hours. Testing of pottery ceramic samples is carried out, sample testing consists of compressive strength tests, density tests, porosity tests, absorptivity tests. The best samples were obtained at 900°C pressed using a press with compressive strength values of 20.16 MPa, absorptivity 9.5%, porosity 20.44% and density 2.15 g/cm³. Based on the results of the highest compressive strength test, characterization was carried out using XRF, XRD and SEM-EDS tools. The results of sample characterization using XRF showed that pottery ceramics were dominated by SiO₂, Al₂O₃ and Fe₂O₃ compounds. The results of sample characterization using XRD show that the phases formed in pottery ceramics are Silicon Oxide (SiO₂), Anorthite (Al₂Ca₀₈Si₁₂) and Wustite (Fe_{1.98}O₂). In addition, the results of sample characterization using SEM-EDS showed the most dominating Si and Al elements.

Keywords: Pottery ceramics, sintering temperature, pressure, clay, boiler slag.