ABSTRAK

PENGARUH VARIASI SUHU DAN WAKTU TERHADAP SIFAT MEKANIS, SIFAT FISIS DAN KARAKTERISTIK GEOPOLIMER BERBAHAN *FLY ASH* DAN *SLAG BOILER*

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Geopolimer merupakan material anorganik yang tersusun dari Si dan Al sehingga dapat digunakan sebagai alternatif pengganti semen melalui reaksi polimerisasi. Beberapa penelitian telah menunjukkan bahwa suhu dan waktu pemanasan dapat berpengaruh terhadap sifat mekanis, sifat fisis dan karakteristik geopolimer. Pada penelitian ini digunakan variasi suhu yaitu 40˚C, 60˚C, 80˚C dan 100˚C dengan waktu pemanasan 6, 10 dan 14 jam. Geopolimer yang digunakan yaitu mortar geopolimer berukuran 5×5×5 cm^3, berbahan *fly ash*, *slag boiler*, NaOH molaritas 10M, Na_2SiO_3 dan air. Pengujian sampel terdiri dari uji kuat tekan, uji absorpsi, uji porositas dan uji densitas. Sampel dikarakterisasi menggunakan alat XRF dan SEM-EDS. Sampel terbaik diperoleh pada suhu 80˚C selama 14 jam dengan nilai kuat tekan 22,80 MPa, absorpsi sebesar 5,80%, porositas sebesar 19,73% dan densitas 3,40 g/cm^3. Hasil karakterisasi sampel menggunakan XRF yaitu senyawa SiO_2 sebesar 52,129%, CaO sebesar 12,936%, Al_2O_3 sebesar 12,234% dan Fe_2O_3sebesar 10,516%. Hasil karakterisasi sampel menggunakan SEM-EDS didominasi unsur O sebesar 47,98%, C sebesar 37,47%, Si sebesar 6,90% dan Al sebesar 3,63%. Berdasarkan hasil penelitian, dapat disimpulkan bahwa variasi suhu dan waktu pemanasan berpengaruh terhadap sifat mekanis, fisis dan karakteristik geopolimer berbahan *fly ash* dan slag *boiler*.

Kata Kunci: geopolimer, pemanasan, *fly ash*, *slag boiler*, karakterisasi

ABSTRACT

EFFECT OF TEMPERATURE AND TIME VARIATIONS ON MECHANICAL PROPERTIES, PHYSICAL PROPERTIES AND GEOPOLYMER CHARACTERISTICS MADE FROM FLY ASH AND BOILER SLAG

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Geopolymers are inorganic materials composed of Si and Al that can be used as an alternative to cement through polymerization reactions. Some researchers have shown that heating temperature and time can affect the mechanical properties, physical properties and characteristics of geopolymers. In this study, temperature variations of 40˚C, 60˚C, 80˚C and 100˚C with heating times of 6, 10 and 14 hours were used. The geopolymer used is a 5×5×5 cm^3geopolymer mortar made from fly ash, boiler slag, NaOH molarity 10M, and water. Sample testing consisted of compressive strength test, absorption test, porosity test and density test. The samples were characterized using XRF and SEM-EDS. The best sample was obtained at 80˚C for 14 hours with a compressive strength of 22.80 MPa, absorption of 5.80%, porosity of 19.73% and density of 3.40 g/cm^3.. The results of sample characterization using XRF are compounds SiO_2 of 52.129%, CaO of 12.936%, Al_2O_3 of 12.234% and Fe_2O_3 of 10.516%. The results of sample characterization using SEM-EDS are dominated by the element O by 47.98%, C by 37.47%, Si by 6.90% and Al by 3.63%. Based on the results research, it can be concluded that variations in heating temperature and time affect the mechanical properties, physical properties and characteristics of geopolymers made from fly ash and boiler slag.

Key words: *geopolymer, curing, fly ash, boiler slag, characterization*