Efek Proses dan Rasio Campuran Cangkang Telur dan Silika Sekam Padi terhadap Pembentukan Semen Hidraulik Dikalsium Silikat = The Effect of Silica Rice Husk and Eggshell Mixture Process and Ratio to The Formation of Dicalcium Silicate Hydraulic Cement

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Abstrak

Latar Belakang: Pemanfaatan material limbah hayati cangkang telur sebagai sumber kalsium dan abu sekam padi sebagai sumber silika dapat digunakan sebagai substitusi komponen utama pada proses pembentukan semen Dikalsium Silikat.
Tujuan: Mengetahui efek proses dan rasio cangkang telur dan silika sekam padi terhadap jumlah prosentase kandungan dikalsium silikat.
Metode: Sebanyak 1 g bubuk cangkang telur hasil milling kering menggunakan alat High Energy Milling dan 1 g silika sekam padi dilakukan uji karakterisasi XRD Sintesis dikalsium silikat dilakukan dengan metode solid state menggunakan empat rasio mol campuran cangkang telur dan silika sekam padi (9,01:3,00) ; (2:1) ; (1,9:1) dan (1,8:1) yang di dapat dari hasil percobaan pendahuluan. Campuran homogen dari masing-masing sampel dilakukan dengan milling basah menggunakan alat High Energy Milling selama 1 jam (700 rpm) dan larutan pencampur HexanTM. Sintesis Dikalsium silikat menggunakan kalsinasi suhu 12000C selama 3 jam pada Muffle Furnace dan proses pendinginan dibiarkan hingga mencapai suhu ruangan tanpa perlakuan khusus tertentu. Semen dikalsium silikat yang terbentuk selanjut dilakukan uji karakterisasi dengan XRD. Data hasil penelitian di sajikan dalam bentuk deskriptif.
Hasil: Proses milling basah dengan rasio cangkang telur dan silika sekam padi 1,8 : 1 menghasilkan prosentase konten C2S (100%) dengan 2 struktur kristalite (monoclinic dan orthorombic). Rasio 1,9:1 menghasilkan 96,22% C2S rasio 2:1 menghasilkan 94,54% C2S dan rasio 9,01: 3,00 menghasikan 71,6% C2S.
Kesimpulan: Proses milling basah dengan rasio cangkang telur dan silika sekam padi 1,8 : 1 pada suhu kalsinasi 12000C selama 3 jam,menghasilkan prosentase kandungan tertinggi (100%) C2S pada semen hidraulik campuran cangkang telur dan silika sekam padi.
.....Background: Silica rice husk and eggshell waste are one of the calcium source that can be used as main component substitute in formation process of Dicalcium Silicate.
Objective: To Determine the effect of silica rice husk and eggshell mixture process and ratio to the percentage formation of dicalcium silicate hydraulic cement.
Methods: 1 gram of eggshell powder produced by dry milling using the High Energy Milling machine and 1 gram of silica rice husk were characterized tested with XRD (X-Ray Diffraction) Dicalcium silicate synthesis was made with solid state method using four mol ratio of the eggshell and silica rice husk mixture, which were (9,01:3,00) ; (2:1) ; (1,9:1) and (1,8:1) from the previous research. Homogenous mixture from each sample were proceed from the wet milling using High Energy Milling for 1 hour (700rpm) and HexanTM solution mixture. Dicalcium silicate synthesis using calcination temperature 12000C for 3 hours on Muffle Furnace and the cooling process were letting to the room temperature without any further treatment. Dicalcium silicate cement were formed using the characteristic test with XRD. The result was

perform in descriptive.
Result: Wet milling process with ratio of eggshell and silica rise husk was 1,8 : 1 content percentage of C2S (100%) with 2 crystallite structure (monoclinic and orthorhombic). Ratio 1,9 : 1 produce 96,22% of C2S, ratio 2:1 produce 94,54% of C2S dan ratio 9,01: 3,00 produce 71,6% of C2S.
Conclusion: Wet milling with ratio of eggshell and silica rise husk was (1,8:1), calcination temperature 12000C for 3 hours produce the highest percentage (100%) of C2S on hydraulic cement from eggshell and silica rise husk mixture.