INTISARI

ANALISIS KOMPOSISI DAN STRUKTUR KIMIA BETON ROMAWI TERMODIFIKASI TERHADAP VARIASI ABU VULKANIK MELALUI *RAMAN SPECTROSCOPY*

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Telah dilakukan penelitian mengenai komposisi dan struktur kimia pasta beton yang merupakan modifikasi dari beton Romawi. Pasta beton dibuat dari campuran OPC (*Ordinary Portland Cement*), abu Gunung Merapi, kapur tohor (CaO), dan air laut. OPC disubstitusi dengan abu merapi dengan variasi 0%, 10%, 20%, 30%, 40%, dan 50% sedangkan kapur tohor dan air laut dibuat tetap. Hasil uji tekan menggunakan *digital force gauge* menunjukkan bahwa kuat tekan tertinggi dimiliki oleh pasta beton variasi 10% (10% abu merapi–90% OPC). Faktor kekuatan tersebut diperjelas dengan hasil karakterisasi *Raman Spectroscopy* yang menunjukkan adanya pembentukan mineral fase C-S-H (*calcium silicate hydrate*) serta C-A-S-H (*calcium aluminosilicate hydrate*) berupa *phillipsite* dan *Aluminium tobermorite.*

Kata kunci: beton, abu vulkanik, semen portland, air laut, *Raman Spectroscopy*

ABSTRACT

COMPOSITION AND CHEMICAL STRUCTURE ANALYSIS FOR MODIFIED ROMAN CONCRETE WITH VOLCANIC ASH VARIATION USING RAMAN SPECTROSCOPY

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We had done a study about composition and chemical structure of concrete pastes from modified roman concrete. Concrete pastes were made from a mixture of OPC, volcanic ash from Mt. Merapi, quicklime, and seawater. OPC was substituted with volcanic ash with variation of 0%, 10%, 20%, 30%, 40%, and 50%. The compressive test was done by digital force gauge. It showed that concrete paste with addition of quicklime had higher compressive strength for up to 10% substitution of OPC with volcanic ash. Raman spectroscopy analysis showed that the formation of C-S-H and C-A-S-H phase such as phillipsite and Al-tobermorite was the key to strength of concrete pastes.

Keywords: concrete, volcanic ash, portland cement, seawater, Raman spectroscopy