

ABSTRAK

SINTESIS KALSIUM KARBONAT PRESIPITASI (PCC) SEBAGAI *MICRO-FILLER* UNTUK *PAVING BLOCK*

(M. FIKRIANSYAH, 61 Halaman, 7 Tabel, 13 Gambar, 3 Lampiran)

Peningkatan volume limbah plastik *High-Density Polyethylene* (HDPE) di Kota Palembang menuntut adanya inovasi pengolahan yang solutif. Penelitian ini bertujuan untuk mensintesis *Precipitated Calcium Carbonate* (PCC) secara mandiri melalui metode karbonasi gas-cair, serta mengaplikasikannya sebagai *micro-filler* pada komposit HDPE untuk pembuatan paving block, dengan variasi suhu peleburan (180°C, 190°C, 200°C) dan komposisi PCC (0%, 5%, 10%, 15%, 20%). Karakterisasi menunjukkan PCC hasil sintesis memiliki pH 10,265 dan densitas 2,6398 g/ml, sedikit berbeda dari produk pembanding akibat sisa reaktan $Ca(OH)_2$ yang belum bereaksi sempurna. Identitas kalsium karbonat dikonfirmasi melalui analisis FTIR dengan pita serapan karakteristik pada 1416,4 cm^{-1} , sejalan dengan literatur pembanding. Kombinasi suhu 190°C dan komposisi PCC 10% menghasilkan kuat tekan optimum sebesar 8,6 MPa, memenuhi standar SNI 03-0691-1996 Kelas D. Laju infiltrasi air tercatat baik, yakni di atas 40 ml/s. PCC hasil sintesis terbukti efektif sebagai *micro-filler* ramah lingkungan.

Kata Kunci: Limbah HDPE, *Precipitated Calcium Carbonate*, *Micro-Filler*, Paving Block, FTIR.

ABSTRACT

SYNTHESIS OF PRECIPITATED CALCIUM CARBONATE (PCC) AS A MICRO-FILLER FOR PAVING BLOCK

(M. FIKRIANSYAH, 61 Page, 7 Table, 13 Figure, 3 Appendices)

The increasing volume of High-Density Polyethylene (HDPE) plastic waste in Palembang City demands a solution-based processing innovation. This study aims to independently synthesize Precipitated Calcium Carbonate (PCC) through a gas-liquid carbonation method and apply it as a micro-filler in HDPE composites for paving block production, with variations in melting temperature (180°C, 190°C, 200°C) and PCC composition (0%, 5%, 10%, 15%, 20%). Characterization showed the synthesized PCC had a pH of 10.265 and density of 2.6398 g/ml, slightly different from the reference product due to residual unreacted $Ca(OH)_2$. The calcium carbonate identity was confirmed via FTIR analysis, showing a characteristic absorption band at 1416.4 cm^{-1} , consistent with reference literature. The combination of 190°C and 10% PCC composition produced an optimum compressive strength of 8.6 MPa, meeting SNI 03-0691-1996 Class D standards for garden applications. Adding PCC above 10% triggered agglomeration that reduced compressive strength. The water infiltration rate was recorded above 40 ml/s. The synthesized PCC proved effective as an eco-friendly micro-filler.

Keywords: HDPE Waste, Precipitated Calcium Carbonate, Micro Filler, Paving Block, FTIR.