

## INTISARI

### **Uji Porositas Material Komposit Berbahan *Ultrafine Amorphous Silica* (UFAS) Sekam Padi Menggunakan Mikro Tomografi Komputer Sinar-X**

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Penelitian ini bertujuan untuk menguji kualitas material tanpa merusak material uji. Pengujian menggunakan seperangkat mikro tomografi komputer (mikro-TK) sinar-X yang telah dikembangkan di Jurusan Fisika, FMIPA, UGM. Objek uji berupa material komposit berbahan UFAS dari sekam padi. Sampel dibuat dalam 3 variasi komposisi M1, M2, M3 berturut-turut yaitu a) serbuk sekam padi ditambah UFAS1, resin, dan katalis, b) serbuk sekam padi ditambah UFAS2, resin, dan katalis, serta c) serbuk sekam padi ditambah UFAS3, resin, dan katalis. Masing-masing UFAS dibakar pada suhu pembakaran berbeda-beda, yaitu 400°C, 600°C, dan 800°C. Sekam padi yang digunakan memiliki kehalusan rata-rata 150 *mesh*. Prosedur penelitian meliputi proses persiapan objek uji, proses pemindaian, pengolahan data, dan analisis data.

Hasil penelitian menunjukkan bahwa nilai koefisien atenuasi linier masing-masing material M1, M2, dan M3 berturut-turut yaitu  $(9,2 \pm 0,5) \times 10^{-3} \text{ cm}^{-1}$ ,  $(9,7 \pm 0,1) \times 10^{-3} \text{ cm}^{-1}$ , dan  $(10,0 \pm 0,1) \times 10^{-3} \text{ cm}^{-1}$ . Nilai porositas material berturut-turut yaitu 13,74%, 11,31%, dan 7,22%. Perbedaan nilai koefisien atenuasi linier dan porositas masing-masing material komposit dipengaruhi oleh perbedaan komposisi material terutama perbedaan suhu pembakaran UFAS. Semakin tinggi suhu pembakaran UFAS memberikan efek nilai koefisien atenuasi linier semakin besar, sedangkan porositas material semakin kecil.

**Kata kunci:** material komposit, mikro tomografi komputer, porositas

## ABSTRACT

### **Testing on Porosity of Composite Material Comprised by Ultrafine Amorphous Silica (UFAS) From Rice Husk Using X-ray Micro Computed Tomography**

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This study was aimed to test the porosity of composite materials. The test was using X-ray micro-computed tomography (micro-CT) system developed at the Department of Physics, Universitas Gadjah Mada, Indonesia. Testing was done for three composite materials comprised by ultra fine amorphous silica (UFAS) from rice husk. Samples were made in three variations of compositions M1, M2, M3 namely a) UFAS1 plus rice husk powder, resin and catalyst, b) UFAS2 plus rice husk powder, resins, and catalysts, and c) powder UFAS3 plus rice husk, resins, and catalysts. Rice husks powder has an average fineness of 150 meshes. The testing procedure included preparation, process of scanning, data processing, and data analysis.

The results showed that the linier attenuation coefficient of material M1, M2, and M3 were  $(9.2 \pm 0.5) \times 10^{-3} \text{ cm}^{-1}$ ,  $(9.7 \pm 0.1) \times 10^{-3} \text{ cm}^{-1}$ , and  $(10.0 \pm 0.1) \times 10^{-3} \text{ cm}^{-1}$  respectively. The porosity of material M1, M2, and M3 were 13.74%, 11.31%, and 7.22% respectively. Differences linear attenuation coefficient and porosity of each composite material is influenced by differences in the composition of the material, especially the UFAS combustion temperature differences. The higher of the UFAS combustion temperature give effect linear attenuation coefficient values greater, while the smaller porosity of the material.

**Keywords:** composite material, micro-computed tomography, porosity