

## ABSTRAK

### PENGARUH PENAMBAHAN MAGNESIUM OKSIDA (0, 20, 25, 30%) TERHADAP KARAKTERISTIK KEKERASAN DAN STRUKTUR FASA BAHAN KERAMIK *CORDIERITE* BERBASIS SILIKA SEKAM PADI

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Telah dilakukan sintesis dan karakterisasi *cordierite* berbasis silika sekam padi dengan penambahan magnesium oksida sebanyak 0, 20, 25 dan 30% ( $C_0$ ,  $C_{20}$ ,  $C_{25}$ , dan  $C_{30}$ ). Pembuatan *cordierite* menggunakan bahan MgO dan  $Al_2O_3$  murni dan silika dari sekam padi yang diekstraksi dengan metode *sol-gel* menggunakan larutan NaOH 1,5% dan  $HNO_3$  10%. Metode yang digunakan adalah metode reaksi padatan (*Solid State Reaction*) dan disintering pada suhu  $1250^\circ C$  dengan waktu tahan selama 3 jam. Pengujian fisis yang dilakukan meliputi penyusutan, densitas dan porositas, sedangkan analisis karakteristik struktur fasa menggunakan XRD (*X-Ray Diffraction*) serta uji kekerasan menggunakan *microhardness tester* dengan metode Vickers. Hasil uji struktur menunjukkan pada  $C_0$  terbentuk fasa *cordierite* dan *spinel*, sedangkan  $C_{20}$ ,  $C_{25}$ , dan  $C_{30}$  terbentuk *spinel*, *forsterite*, dan *periclase*. Uji kekerasan menunjukkan seiring dengan penambahan MgO kekerasan menurun karena menurunnya densitas dan naiknya porositas pada tiap sampel.

Kata kunci : *cordierite*, MgO, silika sekam padi, reaksi *solid state*.

## **ABSTRACT**

### **EFFECT OF EXCESS MAGNESIUM OXIDE (0, 20, 25, 30%) ON HARDNESS AND PHASE STRUCTURE OF CORDIERITE CERAMIC BASED RICE HUSK SILICA**

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*Synthesis and characterization of cordierite-based rice husk silica was done by adding magnesium oxide as much as 0, 20, 25, and 30% (C<sub>0</sub>, C<sub>20</sub>, C<sub>25</sub>, and C<sub>30</sub>). The cordierite was made of pure MgO and Al<sub>2</sub>O<sub>3</sub> and the rice husk silica which was extracted by using sol-gel method using NaOH 1,5% and HNO<sub>3</sub> 10 % solution. The solid state reaction is used, and sample was sintered at 1250 °C with holding time for 3 hours. Physical test included shrinkage, density, and porosity, while characteristic analysis of phase structure was determined with XRD and hardness test used microhardness tester with Vickers method. The result of structure test showed that cordierite and spinel phase were formed on C<sub>0</sub>, meanwhile forsterite, spinel, and periclase were formed on C<sub>20</sub>, C<sub>25</sub>, and C<sub>30</sub>. Hardness test showed that along with the increase of the amount of MgO, the hardness level decrease because of the decrease of density level and the increase of porosity in each sample.*

*Key words: cordierite, MgO, rice husk silica, solid state reaction.*