

PENGARUH SUBSTITUSI Ca TERHADAP SIFAT MEKANIK MEMBRAN PENGHANTAR ION OKSIGEN

OKSIGEN $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$

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ABSTRAK

Membran rapat telah berhasil disintesis dari serbuk oksida perovskit $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$ (LCCF) $0,1 \leq x \leq 0,4$. LCCF disintesis menggunakan metode *solid state* melalui kalsinasi pada suhu 1000°C . Data difraksi sinar-X menunjukkan bahwa oksida LCCF memiliki kekristalan yang tinggi. Membran LCCF dibuat dengan cara penekanan dengan beban sebesar 6 ton selama 10 menit didalam cetakan baja dan disinter dengan suhu 1250°C . Hasil pengamatan morfologi dengan SEM menunjukkan bahwa semua membran LCCF memiliki kerapatan yang tinggi. Tingkat kekerasan rata-rata dalam satuan HV secara berturut-turut adalah 902,08; 915,42; 1093; dan 1178,6 untuk LCCF 9182, 8282, 7382 dan 6482. Pengujian muai panas menunjukkan bahwa LCCF 6482 adalah membran yang paling stabil ditandai dengan koefisien muai panas yang tekecil. Urutan kestabilan membran yakni LCCF 6482 > LCCF 7382 > LCCF 9182 > LCCF 8282.

Kata Kunci: Perovskit, penghantar ion oksigen, membran perovskit, $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$.

EFFECT OF Ca SUBSTITUTION TO MECHANICAL PROPERTIES OF $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$ OXYGEN ION CONDUCTING MEMBRANE

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ABSTRACT

Danse membranes have been successfully synthesized from perovskite oxides $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$ (LCCF) powders ($0,1 \leq x \leq 4$). The powders were prepared from a stoichiometric mixture of each metal oxides and calcined at 1000°C . X-ray diffraction data showed that the resulted powder were LCCF perovskite oxides has high cristallinity. The LCCF membrane were pressed in a hardened stainless steel by applying pressure of 6 tonnes during 10 minutes and sintering process at 1250°C . SEM analysis results of membranes morphology show that perovskite membrane has hight danse. Their average hardness (reported as HV) were 902,08; 915,42; 1093; and 1178,6 for LCCF 9182, 8282, 7382 and 6482. Thermal expansion analysis resulted LCCF 6482 membrane was the most stable. Their Thermal Expansion Coefficient (TEC) were $\text{LCCF 6482} > \text{LCCF 7382} > \text{LCCF 9182} > \text{LCCF 8282}$.

Key Words: Perovskite, Oxygen Ion Transfer, perovskite membrane, $\text{La}_{1-x}\text{Ca}_x\text{Co}_{0,8}\text{Fe}_{0,2}\text{O}_{3-\delta}$.