ABSTRAK

Penelitian ini dilakukan untuk mengetahui proses sintesis material $BaPb_{0,75}Bi_{0,25}O_3$ untuk membentuk temperatur kritis yang optimal. Metode sintesis ini menggunakan metode reaksi padatan yang meliputi proses *mixing* yang berupa penggerusan, kompaksi dan *sintering*. Variasi temperatur *sintering* yang digunakan yaitu 600°C, 625°C, 700°C, 800°C, 825°C dan 900°C dengan waktu penahanan selama ±12 jam. Karakterisasi material $BaPb_{0,75}Bi_{0,25}O_3$ dalam penelitian ini menggunakan 3 tahap pengujian, yaitu pengujian analisis resistivitas terhadap temperatur (*Cryogenic Magnet*), pengujian analisis fasa (XRD) dan pengujian analisis morfologi (SEM). Hasil uji karakterisasi *Cryogenic Magnet* menunjukkan dua material temperatur 625°C dan 700°C sudah terbentuk superkonduktor dengan ditandainya nilai temperatur kritis Tc_{onset} yang sama yaitu -261°C (12 K) dan mempunyai nilai Tc_{zero} yaitu -262,3°C (10,7 K) serta -262,6°C (10,4 K). Pada temperatur *sintering* 600°C, 800°C dan 825°C material bersifat semikonduktor serta pada temperatur *sintering* 900°C material bersifat isolator. Dari hasil analisis sintesis material $BaPb_{0,75}Bi_{0,25}O_3$ menggunakan metode reaksi padatan menunjukkan temperatur kritis yang optimal didapat pada temperatur *sintering* 625°C dan 700°C dengan waktu tahan 12 jam. Hasil uji karakterisasi XRD menunjukkan material sudah terbentuk fasa $BaPb_{0,75}Bi_{0,25}O_3$ dengan struktur kristal tetragonal. Hasil uji karakterisasi SEM menunjukkan porositas cenderung berkurang seiring meningkatnya temperatur. Pengujian XRD dan SEM dilakukan untuk memperkuat hasil superkonduktivitas suatu bahan.

Kata kunci: metode reaksi padatan, *sintering*, superkonduktor, semikonduktor dan isolator.

ABSTRACT

This research was conducted to determine the synthesis process of material $BaPb_{0,75}Bi_{0,25}O_3$ *to form an optimal critical temperature. This synthesis method uses a solid state reaction which includes a mixing process in the form of grinding, compacting and sintering. Variations of sintering temperature used is 600°C, 625°C, 700°C, 800°C, 825°C and 900°C with a hold time ±12 hours. The characterization of material* $BaPb_{0,75}Bi_{0,25}O_3$ *in this research used 3 stages of testing, that is testing the resistivity analysis to temperature (Cryogenic Magnet), testing phase analysis (XRD) and testing the morphological analysis (SEM). The results of the cryogenic magnet characterization test showed that the two material temperature 625°C and 700°C had formed a superconductor by marking the same critical temperature Tconset, that is -261°C (12 K) and has a Tczero value that is 262,3°C (10,7 K) and -262,6°C (10,4 K). At sintering temperature 600°C, 800°C and 825°C the material is semiconductor and at a sintering 900°C the material is an insulator. From the results of the synthesis analysis of the material* $BaPb_{0,75}Bi_{0,25}O_3$ *using the solid state reaction, it shows that the optimal critical temperature is obtained at 625°C and 700°C sintering temperature with a holding time of 12 hours. The XRD characterization test results showed that the material had a* $BaPb_{0,75}Bi_{0,25}O_3$ *phase with a tetragonal crystal structure. The SEM characterization test results show that the porosity tends to decrease with increasing temperature. Tests XRD and SEM were carried out to strengthen the superconductivity of a material.*

Keywords: *Solid state reaction, sintering,* superconductor, semiconductor and insulator.