Sintesis ca3co2o6 dan camno3 dari bahan baku caco3 coco3 dan mnco3 melalui proses reaksi padatan = Synthesis of ca3co2o6 dan camno3 using caco3 coco3 and mnco3 raw material by solid state reaction process

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Abstrak

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Pemanfaatan panas yang tidak terpakai adalah salah satu bentuk efisiensi energi. Panas yang tidak terpakai dari industri dan transportasi dapat dikonversikan menjadi energi listrik dengan menggunakan material termoelektrik. Keramik Ca3Co2O6 dan CaMnO3 adalah salah satu contoh material. Penelitian yang dilakukan adalah percobaan sintesis keramik Ca3Co2O6 dan CaMnO3 menggunakan metode proses reaksi padatan.
Sintesis material menggunakan bahan baku berbasis karbonat, yaitu CaCO3, CoCO3 dan MnCO3. Sintesis dilakukan dengan mengacu pada diagram fasa sistem Ca-Co-O dan Ca-Mn-O. Berdasarkan analisis termal, untuk mendapatkan fasa CaO, Co3O4 dan Mn2O3 maka bahan baku yang berbasis karbonat harus dikalsinasi pada suhu 800°C. Suhu pembentukan Ca3Co2O6 berdasarkan diagram fasa sistem Ca-Co-O dan Ca-Mn-O adalah pada rentang suhu 824-1027°C dan CaMnO3 pada rentang suhu 1100-1600°C dengan lingkungan atmosfir udara bebas.
Hasil sintesis diperoleh fasa Ca3Co2O6 terbentuk paling baik pada suhu 1000°C, tetapi masih terdapat fasa lain yaitu CoO dan Co3O4. Fraksi berat masing-masing fasa adalah Ca3Co2O6 : CoO : Co3O4 = 71,1 : 21,6 : 7,3. Sedangkan pada sintesis CaMnO3, fasa CaMnO3 sudah terbentuk satu fasa pada suhu 1100°C.
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ABSTRACT
Heat is one kind of energy source that can increases energy efficiency. Heat from industrial and transportation can be converted into electrical energy through a thermoelectric material. Ca3Co2O6 and CaMnO3 ceramics are thermoelectric materials. The main idea of this research is synthesis of Ca3Co2O6 and CaMnO3 ceramics using solid state reaction method.
Synthesis of thermoelectric materials using carbonate-based raw materials. The raw materials are CaCO3, CoCO3 and MnCO3. Synthesis of material is done with reference to the phase diagram system of Ca-Co-O and Ca-Mn-O. Based on thermal analysis, the carbonate-based raw materials must be calcined at temperature 800°C to get CaO, Co3O4 and Mn2O3 phases. The temperature formation of Ca3Co2O6 and CaMnO3 are about 824-1027°C based on phase diagram system of Ca-Co-O and 1100-1600°C based on phase diagram system of

Ca-Mn-O in air.
Ca3Co2O6 phase is formed at temperatures of 1000°C, but there were some other phase, i.e,. CoO and Co3O4. Weight fraction of each phase is Ca3Co2O6 : CoO : Co3O4 = 71,1 : 21,6 : 7,3. While CaMnO3 one phase is already formed at 1100°C.;Heat is one kind of energy source that can increases energy efficiency. Heat from industrial and transportation can be converted into electrical energy through a thermoelectric material. Ca3Co2O6 and CaMnO3 ceramics are thermoelectric materials. The main idea of this research is synthesis of Ca3Co2O6 and CaMnO3 ceramics using solid state reaction method.
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