

## Pengaruh penambahan 0,5 mol berat Mn terhadap fasa dan struktur kristal barium titanat (BaTiO<sub>3</sub>)

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### Abstrak

Telah dilakukan analisa mengenai pengaruh penambahan 0.5 inol berat Mn terhadap fasa dan Struktur kristal barium titanat (BaTiO<sub>3</sub>). Cuplikan diperoleh dengan metoda metalurgi serbuk dengan bahan dasar BaCO<sub>3</sub>, MnO<sub>2</sub>, dan TiO<sub>2</sub> yang merupakan grade reagen dari E-Merck, dengan perbandingan masing-masing 1 : 0,5 : 0,5. Difraktogram sinar-X dengan  $\lambda$  (Co K.O.) = 1,7889 Å dan scan secara kontinu pada temperatur kamar dianalisis menggunakan program kristalografi GSAS. Analisis struktur metnperlihatkan bahwa bahan terdiri dari 5 (lima) fasa, BaMn<sub>0.5</sub>Ti<sub>0.5</sub>O<sub>3</sub> sebagai fasa utama dengan grup ruaiig P4mm, parameter kisi a dan c masing-masing 3,999 Å dan 4,025 Å, faktor pencocokan (i educed x ) =- 2,175 dan 45 variabel. Sedangkan 4 (empat ) fasa pengotor tersebut masing-masing memiliki fraksi berat yaitu BaCO<sub>3</sub>, (45,83%); MnO<sub>2</sub> (8.47%); TiO<sub>2</sub> (20,36%) dan MnTi<sub>2</sub> (6,75%) masing-masing dengan grup ruang Pnma, P 42/mnm, Pbcu dan P 63/mmc.

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The effect of 0.5 weight mol Mn on phase and crystal structure of barium titanate has been analyzed. The best sampel in this study were synthesized using powder metallurgy with stoichiometric amounts of BaCO<sub>3</sub>, MnO<sub>2</sub> and TiO<sub>2</sub> that were reagents from E-Merck. The X-ray diffractograms which were obtained with continuous counts and  $\lambda$  (Co Ka) = 1.7889 Å at room temperature, were refined using the crystallographic software package GSAS. Structural analysis shows that sample consists of 5 (five) phase where the crystal is BaMn<sub>0.5</sub>Ti<sub>0.5</sub>O<sub>3</sub>, with the perovskite-type BaTiO<sub>3</sub> structure, the space group tetragonal P4mm, a = 3.999 Å, c = 4.025 Å. the goodness of fit  $\chi^2$  is of 2.175 with 45 variables and the residual parameters Rp and Rwp are of 18.8% and 24.2% respectively. The four phase impurity has a weight fraction is BaCO<sub>3</sub>, (45.83%); MnO<sub>2</sub>, (8.47%); TiO<sub>2</sub> (20,36%) and Mn<sub>2</sub>Ti (6,75%) with the space group each are Pnma, P 42/mnm, P 41/amd and P 63/mmc.