

Abstract Submitted  
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**Structure Refinement of a Sol-gel Derived Pyrochlore  $\text{Bi}_2\text{Ti}_2\text{O}_7$  Using a Neutron Scatterings** WON-JEONG KIM, SANG SU KIM, JONG KUK KIM, JUN KI CHUNG, MUN HEUM PARK, TAE GON HA, EUN JIN CHOI, JIN WON KIM, HYUN KYEONG CHO, Dept. of Physics, Changwon National University — Structure of the sol-gel derived pyrochlore  $\text{Bi}_2\text{Ti}_2\text{O}_7$  has been refined by a Rietveld analysis method using neutron and x-ray scattering data. The structure of  $\text{Bi}_2\text{Ti}_2\text{O}_7$  was assumed as Fd-3m (space group number 227). The calculated lattice constant was 10.3735(3) nm. The sample contains a majority  $\text{Bi}_2\text{Ti}_2\text{O}_7$  phase and minor  $\text{Bi}_4\text{Ti}_3\text{O}_{12}$ ,  $\text{Bi}_{12}\text{TiO}_{20}$ , and  $\text{TiO}_2$  phases. After subtracting the secondary phases effect, the total goodness of fit using both scatterings was converted to  $\chi^2 = 2.6$ ,  $R_p = 6.5\%$ , and  $wR_p = 8.6\%$ , which suggesting that the refined structure of  $\text{Bi}_2\text{Ti}_2\text{O}_7$  is reasonable. Bi atom occupies 96 g site with probability of 0.158(1), while O occupies 8 a site by 0.884(16). Furthermore,  $\text{Bi}_2\text{Ti}_2\text{O}_7$  thin film has been fabricated by a sol-gel method. After depositing electrodes, electrical properties of the thin film have been measured. Interestingly, a ferroelectric characteristics has been observed; electric field dependent dielectric constant. The refined structure information of  $\text{Bi}_2\text{Ti}_2\text{O}_7$  may explain the observed ferroelectricity of the thin films. Details of the structural and electrical properties of  $\text{Bi}_2\text{Ti}_2\text{O}_7$  will be discussed.

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