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## EFFECT OF SINTERING TIME ON PHASE, PHYSICAL PROPERTIES, MICROSTRUCTURE AND THERMAL CONDUCTIVITY OF $Y(Ba_{1-x}La_x)_2Cu_3O_{7-\delta}$ CERAMICS

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Sireetone Yawirach<sup>a,b</sup>, Pimpilai Wannasut<sup>a</sup>, Anucha Watcharapasorn<sup>a,c,\*</sup>

<sup>a</sup>Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

<sup>b</sup>Graduate School, Chiang Mai University, Chiang Mai 50200, Thailand

<sup>c</sup>Center of Excellence in Materials Science and Technology, Materials Science Research Center, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

\*Corresponding author, e-mail: anucha@stanfordalumni.org

**Abstract:** This work investigates the effects of various sintering conditions on phase, physical properties microstructure and thermal conductivity of  $Y(Ba_{1-x}La_x)_2Cu_3O_{7-\delta}$  where  $x = 0, 0.05, 0.10, 0.15, 0.20$  and  $0.25$  mol fraction. The sintering conditions involved the sintering temperature of  $920^\circ\text{C}$  and sintering time of 6, 8, 10 and 12 h. It was found that pure phase could be obtained in the samples sintered for 6 h regardless of composition. However, small amount of  $BaCuO_2$  secondary phase was obtained at other sintering time. The relatively low density and significantly reduced grain size was obtained in the samples with high La content (e.g.  $x = 0.20$  and  $0.25$ ) regardless of the sintering time. This showed that La addition had apparent effects on sinterability and grain growth. Phase analysis indicated that the structure changed from orthorhombic to tetragonal when the La concentration reached 0.20 and 0.25 mol fraction. SEM images of all ceramics also indicated irregular shaped grains. The effects of variation in density, microstructure and composition on the thermal conductivity of all ceramics were also discussed in details.

**Author:** Ms YAWIRACH, Sireetone

**Co-authors:** WANNASUT, Pimpilai; WATCHARAPASORN, anucha

**Presenter:** WATCHARAPASORN, anucha

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