

## ABSTRACT

### THE INFLUENCE OF SINTERING TEMPERATURE ON THE STRUCTURE OF Na<sub>2</sub>O FROM Na<sub>2</sub>CO<sub>3</sub> PRODUCED BY COCONUT SHELL COMBUSTION

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This research was carried out to study the influence of sintering temperature on the structure of Na<sub>2</sub>O from Na<sub>2</sub>CO<sub>3</sub>. Na<sub>2</sub>CO<sub>3</sub> obtained by flowing CO<sub>2</sub> gas of coconut shell combustion into NaOH solution to absorption and concentration of NaOH, with the concentration 9 and 10 M. The product was cleaned by using 70% alcohol, then filtered out and subsequently oven dried at 110 °C for 10 hours. The results obtained indicate that the amount of Na<sub>2</sub>CO<sub>3</sub> produced depend on the concentration of NaOH solution with the highest yield obtained using 10 M NaOH solution. The Na<sub>2</sub>CO<sub>3</sub> powder was characterized using FTIR to determine the functional groups formed. The Na<sub>2</sub>CO<sub>3</sub> was sintered at 800, 825 and 850 °C for 3 hours to study the influence of sintering temperature on formation and structure of Na<sub>2</sub>O. Na<sub>2</sub>O powder was ground and then characterized using SEM-EDS, XRD and DSC-TGA. FTIR results show all samples have the same functional groups associated with standard, include C=O and CO<sub>3</sub><sup>2-</sup> with additional functional groups of -OH, C-H dan C-S, likely the resulted from water and some natural impurities of coconut shell. The results of SEM indicated that the sample sintered at 850 °C was small grain sizes distributed homogenously. The results of XRD samples after sintering at 800 and 825 °C show presence Na<sub>2</sub>CO<sub>3</sub> and Na<sub>2</sub>O while after sintering at 850 °C the phase indentified was Na<sub>2</sub>O. Thermal analysis by DSC-TGA indicates that conversion Na<sub>2</sub>CO<sub>3</sub> to Na<sub>2</sub>O depends on the concentration of NaOH solution used, with the highest yield obtained using concentration of 9 M.

**Key words:** *Na<sub>2</sub>O, Na<sub>2</sub>CO<sub>3</sub>, CO<sub>2</sub> gas, coconut shell, sintering temperature, functional groups, microstructure, phase, termal.*