

**SYNTHESIZED AND CHARACTERIZATION OF SODIUM
COBALT OXIDE AS SODIUM-ION CATHODE BATTERIES
USING SOL-GEL METHOD**

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ABSTRACT

SYNTHESIZED AND CHARACTERIZATION OF SODIUM COBALT OXIDE AS SODIUM-ION CATHODE BATTERIES USING SOL-GEL METHOD

Sodium Cobalt Oxide (NaCoO_2) cathode material in a sodium-ion battery was synthesized by a Polyvinyl Alcohol (PVA) assisted sol-gel method and its physical characterization was being analyzed by using Thermogravimetric Analysis (TGA), Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) Spectroscopy and Field Emission Scanning Electron Microscope (FESEM). After the TGA analysis, the calcination temperature for the cathode material was determined and $800\text{ }^\circ\text{C}$ was set up at the furnace. That temperature was chosen as calcination temperature because the TGA curve becomes flat and no mass loss occurs at temperature above $750\text{ }^\circ\text{C}$. It indicates that the reaction was totally completed. In the ATR-FTIR analysis, the presence of cobalt oxide in the sample was confirmed by the peak at 567 cm^{-1} that indicating the Co-O bond. Others, the peak at 1219 and 1431 cm^{-1} were corresponding to C-O and C-O-H bond respectively. Under magnification of FESEM, the morphology of cathode material particles were observed heterogeneous, smooth surface and many particles were agglomerate. In this study, the confirmation about electrochemical ability of synthesized NaCoO_2 cathode material cannot be made because no electrochemical characterization was being performed.