

**TITLE** Development of Al-Zn Alloy Cathode and Cu Anode for Electrochemical Cells

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**YEAR** 2017

## ABSTRACT

Al-Zn alloy cathode and Cu anode were studied the physical and electrical properties for fabricating electrochemical cells. Al-Zn alloy cathode was synthesized by doping metal powder of Zn (1, 2, 3, 4 and 5 wt%) into Al and metal powder. Cu was prepared for anode by using hotpress technique. Crystal structure, microstructure, properties and electrochemical electrical batteries fabrication were studied for developing route Al cathode. It was found that Zn atoms completely substituted into vacancy atoms of Al structure. Density of Al-Zn (1, 3 and 5 wt%) were 1.83, 2.11 and 2.44 g/cm<sup>3</sup>, respectively. While, Vicker microhardness of Al-Zn (1, 3 and 5 wt%) were 134, 196 and 292 MPa, respectively. Scanning electron microscopy (SEM) showed microstructure of Al-Zn alloy cathode and Cu anode after dipping into NaCl solution with having a hole larger than before dipping. Meanwhile Zn content could be reduced corrosion of NaCl solution. Electrochemical properties were determined by using cyclic voltammetry technique. Al-Zn (3 wt%) was transferred into maxima electrons. In addition, discharge properties were investigated by measuring current and voltage at 10 Ω. Al-Zn (3 wt%) has maximum power of 3.5 mW for 40 min. 4 cell of Al-Zn (3wt%) were fabricated electrochemical battery which could make a bright LED light for 10 min. This study suggests that metal powder of Zn could improve the physical and electrochemical properties for future practice.

**Keywords:** Al-Zn alloy cathode and Cu anode physical and electrochemical properties