

# Abstract

Lithium titanate and titanium dioxide are known to be the best materials for their excellent cyclic performance.  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  (LTO) was synthesized by hydrothermal method and its capacitive properties were investigated with doping of cesium ions for various ratios (0.03 wt%, 0.06 wt % and 0.09 wt%). The x-ray diffraction (XRD) analysis was performed to investigate its crystal structure and Fourier transform infrared spectroscopy was conducted for the chemical analysis. The XRD analysis indicate the successful synthesis of  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  phase with mixtures of  $\text{TiO}_2$ . The cyclic voltammetry (CV) curves indicate the excellent performance of the LTO deposited on nickel foam electrodes as working electrodes and in 1 M LiOH electrolyte solution. The CV analysis shows that discharge time increases by increasing the cesium doping. At 0.09 wt% doping, the charging and discharging time increases up to 3210 seconds. The specific capacitance increases up to  $800 \text{ F g}^{-1}$  and it increases exponentially by increasing the doping concentration of cesium.