This thesis investigates the structural and electrochemical properties of strontium cobaltite ($SrCoO_3$) nanoparticles synthesized via sol-gel method, focusing on their application as electrode materials for supercapacitors. To enhance its performance doping it with copper in different pecentages 1 wt% 3 wt% and 5 wt%. To analyze its structural properties characterization techniques such as X-ray diffraction (XRD), and scanning electron microscopy (SEM), Energy Dispersive X-ray Spectroscopy (EDX) and Raman Spectroscopy performed. XRD reveal that structure for SrCoO3 found to be Hexagonal with space group p3c1. The XRD peaks shift towards the lower angles with increasing doping and crystallite sizes decrease. Hexagonal structures are also visible in SEM micrographs with average particle size of 1.3 μm. EDX shows that Cu is successfully deposited in the sample. Raman spectra exhibits different stretching and bending bands of Co-O, Sr-O and Cu-O. To analyze the electrochemical behaviour of the material, the techniques such as Cyclic Voltammetry (CV), Galvanostatic Charge and Discharge Curves (GCD) and Electrochemical Impedance Spectroscopy (EIS) are performed. CV shows clear oxidation and reduction peaks with excellent reversibility. GCD analysis shows that charging and discharging time increased by increasing doping concentration and the value for specific capacitance and energy density also increases by increasing doping concentration. For 5 wt% doping, specific capacitance found to be 2200 F/g and value for energy Density 275 Wh/Kg. Electrochemical analyses, including cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD) tests, demonstrate that optimal Cu concentrations significantly improve specific capacitance and energy density, owing to enhanced conductivity and increased surface area. These findings not only explain the beneficial effects of Cu doping on the electrochemical behavior of strontium cobaltite but also contribute to advancements in supercapacitor technologies, highlighting the potential of transition metal-doped perovskites in optimizing energy storage systems.