

In this work a modest and environmental-friendly green synthesis approach is used to synthesize  $CuO/SnO_2$ ,  $CuO/SnO_2/PVP$  and  $CuO/FeO/SnO_2/PVP/rGO$  nano-composites designated as R1, R2 and R3, respectively, utilizing the extract of lemon leaves. The impact of PVP and rGO on metal oxides is analyzed by adding them sequentially in metal oxide. Among these greenly synthesized nano-composite materials i.e., R1, R2 and R3, respectively are being reported that R3 nano-composite unveils improved electrochemical characteristics because of reinforced intercalation and deintercalation of electrolyte ions across the electrode material. Further, R3 showing low impedances of various kinds, it displays better conductivity by yielding the largest area under the CV curves at different scan rates. The corresponding specific capacitance of R3 evaluated from cyclic voltammogram at 3 mV/s is 411 F/g more than that demonstrated by R1 and R2 with values of 300 F/g and 311 F/g, respectively. The highly improvised electrochemical properties of R3 are dominated by the good conductive nature of PVP and rGO that further aid the interaction of ions and redox sites. Following the enhanced energy storage capabilities of R3, it highlights the significance of PVP and rGO as potential aides for escalation of reversible oxidation-reduction activities.