In the present research, nanosized manganese-nickel binary oxide pseudocapacitor (MNO) was deposited on stainless steel substrate from an acetate solution via anodic electrodeposition (potentiodynamic) at room temperature. Then, with the aim of tailoring and improving the pseudocapacitive behavior and cycle stability of the MNO electrode, effect of different parameters on morphology, microstructure and electrochemical behavior of MNO pseudocapacitor were studied. Those parameters include: deposition upper potential limit, mass loading of oxide per unit area, deposition bath pH, deposition scan rate, annealing temperature and Ni to Mn molar ratio in deposition bath. The results showed that the density of oxide films decreases with increasing deposition bath pH in the range from ٤ to ٧, which expectedly translates in an attendant increase of porosity and active surface area. Annealing process led to the formation of a complex structure with composite nature, consisting of intermixed amorphous and nanocrystalline phases. In addition, the specific capacitance as a function of Ni content in the oxide film, showed a maximum at approximately ١٠ at% Ni , where further increase of the Ni content dropped the specific capacitance most likely due to decrease of the film porosity.

Keywords : Supercapacitors; Nanosized manganese-nickel binary oxide; Electrodeposition; Potentiodynamic