The potential towards reversible hydrogen electrode (RHE) has been determined using the Nernst equation,

$$E_{RHE} = E_{Ag/AgCl} + 0.059 \times pH + E^{0}_{Ag/AgCl} \quad (1)$$

Where, E_{RHE} is the converted potential versus an RHE, $E^{0}_{Ag/AgCl}$= 0.197 V at room temperature (27 °C) and $E_{Ag/AgCl}$ is the experimental measured potential versus Ag/AgCl reference electrode. The over potential (η) has been calculated using the following equation:

$$\eta = E_{RHE} - 1.23 \quad (2)$$

where, η and E_{RHE} are the over and converted potentials, respectively.

The Tafel slope has been determined using the equation,

$$\eta = b \log j + a \quad (3)$$

where, b is the Tafel slope and a is the fitting parameter.

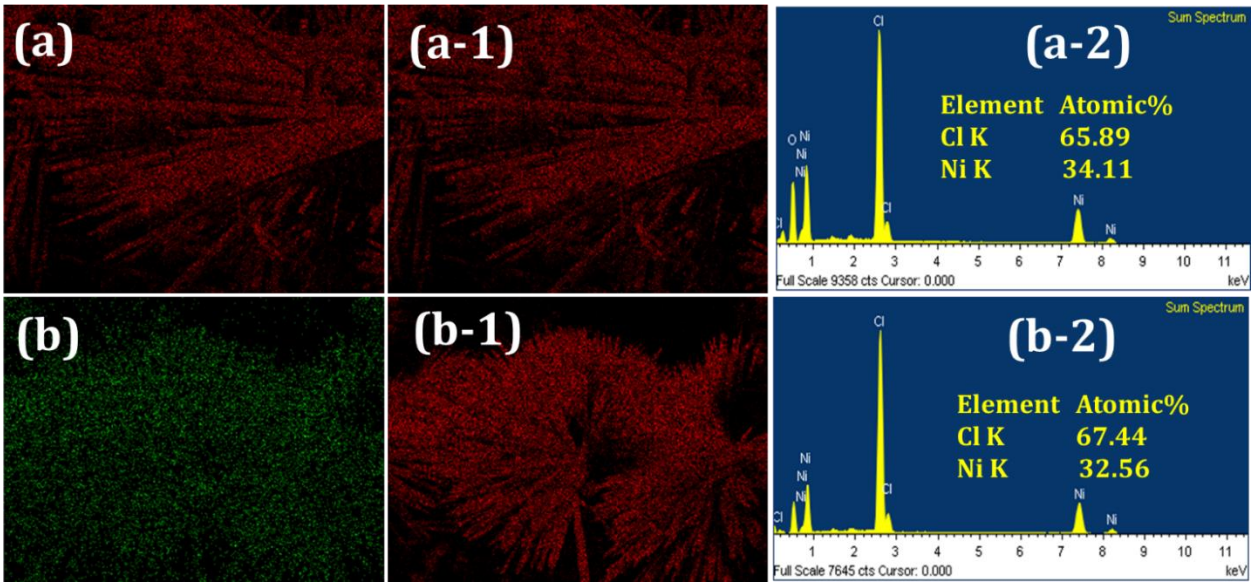

Figure S1: Fig. (a-a-2, b-b-2) surface Ni and Cl element mapping and EDX spectra of with and without glycerol $NiCl_2$ at different magnifications.