Figure 1 shows the performance of single cell using N112, NS10W,NS15, NS15W and NS20W as the solid electrolyte operated at 90°C and 40% RH. The best performance under these conditions was obtained for NS15W, which produced current density of 82 mA cm^{-2} at 0.6 V as compared to the Nafion membrane with 30 mA cm^{-2} at 0.2 V. As show by Figure 1 (a-c) and Figure 2 (a-b) all of the composite membranes (NS10W, NS15W and NS20W) showed better performance than the Nafion membrane under these conditions possibly due to the incorporation of the inorganic hygroscopic materials to the Nafion polymer matrix.

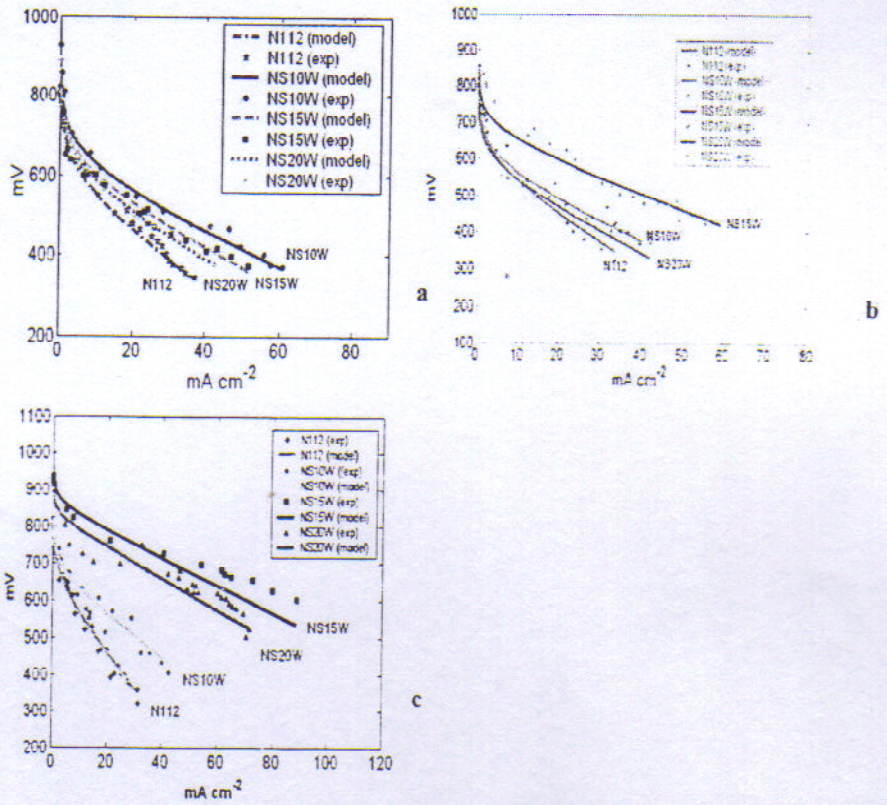

Figure 1 Polarization curves of N112, NS10W, NS15W,NS20W and NS15 membranes at (a) 60°C, (b) 80°C and (c) 90°C and at 40% RH.

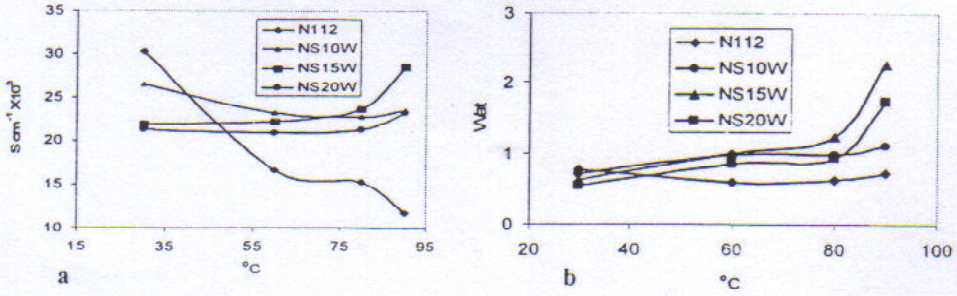

Figure 2 (a) Conductivity, (b) Power of N112, NS10W, NS15W,NS20W and NS15 membranes at temperature (30°C, 100% RH) and (60-90)°C at 40% RH