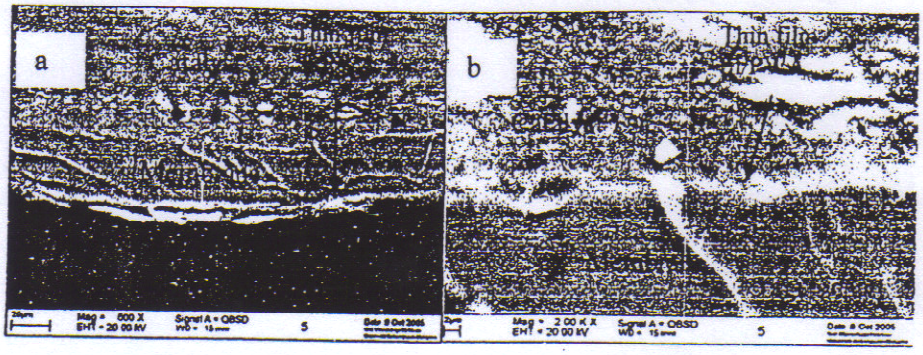

Fig.5. SEM analysis : Cross sectional of the membrane electrode assemblies (MEA) consist catalyst layer, Si/PWA film and membrane Nafion 112, a) Magnification 500 X and b) 2000X.

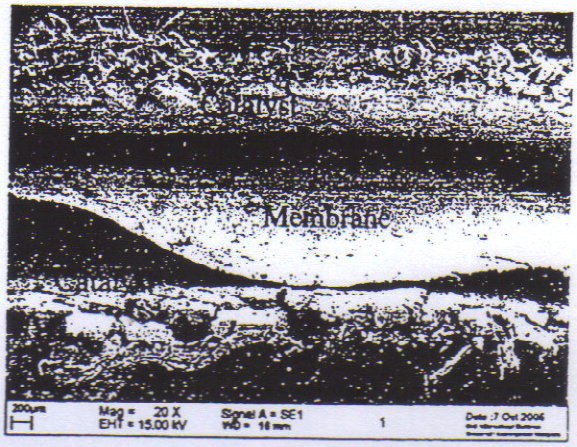

Fig.6. SEM analysis: Cross sectional of the membrane electrode assemblies (MEA) consist catalyst layer, and membrane

Conclusion

The sol-gel casting technique was employed to produce membrane electrode assemblies (MEA) of proton exchange membrane fuel cell (PEMFC), as a means for better distribution of metal catalyst, such as Pt, residing on the membrane surface. This in itself will make the catalyst used to be more efficient. To ensure the catalyst activity using this technique the experiment is conducted using various Pt loading on the surface of electrolyte membrane. The performance of the MEA has test using Fuel Cell Test System (FCTS) at the same operation condition, and the result shows as in fig.1. Current and voltage increase appropriate with increasing the catalyst loading from 0.38 until 0.47 mg/cm2. The catalyst stability test during 45 hours and the performance stable at 0.4 V the current is 0.3 A as shows in fig.2,. for the catalyst loading 0.43 mg/cm^2 at room temperature. In comparation with commercial MEA as in fig 3 and Fig.4. Shows the sol-gel MEA with lower loading produce a better voltage and current. The result of SEM analysis, show the characteristic of surface linking structure between catalyst and membrane layer. Fig.5 and fig.6 show clearly the difference structure between sol-gel MEA and MEA conventional . Sol-gel MEA show better surface linking between catalyst and membrane layer then conventional MEA. So that could to be concluded that sol-gel process is applicable for membrane electrode assemblies, and have advantages improve performance of proton exchange membrane fuel cell (PEMFC).