CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This research successfully introduced sulfonic acid groups to the backbone of poly (arylene ether sulfone), which was confirmed by FTIR and H-NMR techniques. The degree of sulfonation in the polymer chains obtained via H-NMR was 8%. In addition, the PWA/ZSM-5 composite polymer membranes and unfilled polymer membranes could be stable as high as 200°C, indicating that the membranes could be operated in the proton-exchange membrane fuel cell at high temperature where electrodes work better. The ratio of PWA to ZSM-5 in a membrane was found to be 3 to 7 that could give the highest value of ion exchange capacity. For a constant weight of a membrane, increasing the PWA/ZSM-5 amount while decreasing the polymer content could not significantly affect the ion exchange capacity and water uptake. The weight percent of inorganic at 15 and up caused unevenly distribution of inorganic across a membrane. For aged membranes at various temperatures and 100% relative humidity, tensile strength and Young's moduli were quite constant over those temperature range.

Reccommendation

The method for preparation of the sulfonated poly(arylene ether sulfone) should be developed that is because the post sulfonation reaction can not control the position and degree of sulfonation of the poly(arylene ether sulfone).