CHAPTER 5 CONCLUSIONS AND RECCOMENDATIONS

5.1 Conclusions

Heat treatment on carbon support of Au/C catalyst could improve the catalytic activity of Au/C catalyst for high molecular weight alcohol electrooxidation. Au particle size on heat treated carbon was smaller than those on untreated carbon leading to more active Au catalyst for glycerol and ethylene glycol oxidation. It was also found that particle size effect was more important than the capacity of gold oxide formation on electrode surface. Furthermore, the tolerance to poisoning of Au/ treated carbon was higher than Au/ untreated carbon. Therefore it can be concluded that the heat treatment on carbon support can improve the performance of Au/C catalyst.

Increasing the amount of Au in Au/C catalyst led to particle size agglomeration resulting in a reduction of catalytic activity in alcohol oxidation. Although 20 wt% Au/C had higher decaying rate than 30 wt% and 40 wt% Au/C, it can produce higher current density. Since the increase of Au loading could cause Au particle agglomeration resulting in a reduction of Au catalytic activity, the suitable Au loading for Au/C catalyst was 20 wt%.

Catalyst preparation methods could also affect the performance of Au/C catalyst in alcohol electrooxidation. In overall, the particle size of Au/C catalyst prepared by PVA protection method was smaller than that from citrate protection method. Consequently, the catalytic activity of the Au/C catalysts prepared by the PVA protection method was higher than those prepared by the citrate protection method. In addition, PVA protection method provided higher tolerant catalyst. Therefore the suitable Au/C catalyst preparation method was the PVA protection technique.

5.2 Recommendations

To ensure the effect of heat treatment 30 wt% and 40 wt% Au of Au/C catalysts with untreated carbon should be studied. Furthermore the suitable amount of Au in Au/C catalyst should be investigated by varying Au loading in the narrow range.

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