

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The conclusions of this research are summarized as follows:

Effect of time for introducing pyrrole vapour

It is reasonable to explain that the decline of maximum band at 3386 cm^{-1} of pyrrole adsorption on pure MgO is affected by the hindrance of baseline of H_2O band which cannot be absolutely removed with the molecular sieve and the baseline of the maximum band at 3386 cm^{-1} will be changed. Therefore, the suitable time for introducing pyrrole vapour is about 10 minutes to investigate the pyrrole adsorption by FTIR technique.

Effect of time for evacuation after introducing pyrrole vapour

The correlation of time for evacuation after introducing pyrrole vapour tended to decrease with increasing the evacuation time. Hence, in the subsequent experiments the time for evacuation after introducing pyrrole vapour was set at 90 min.

Adsorption of pyrrole and CO₂ on various catalysts by GC

Comparing amount of pyrrole and CO₂ adsorption on various catalyst surface, MgO, NaY, Ca(OH)₂ and Na-mordenite showed that there are more CO₂ adsorption than pyrrole on MgO, NaY, Ca(OH)₂. In contrast of Na-mordenite, there is less CO₂ adsorption than pyrrole.

Distinguishing between Brønsted basic sites and Lewis basic sites by FTIR

From the result of in-situ FTIR of magnesium oxide and calcium hydroxide it may be concluded that this technique could not be used to distinguish Brønsted basic sites and Lewis basic sites because of it can not assign IR adsorption band of pyrrole adsorption on surface basic site on calcium hydroxide, which is a representative of Brønsted basic catalyst.

Although pyrrole could not be used for distinguishing IR adsorption band between Brønsted basic sites and Lewis basic sites. But it can be used to measure the basic strength of catalysts from bathochromic shift of the broad $\nu(\text{NH})$ stretching frequency. It is recommended that this probe molecule should be used for measuring only basic strength of total basic sites of catalyst.

6.2 Recommendation

From the above results, it can be recommended that pyrrole should be used as probe molecule for measurement basicity of zeolite catalysts because these catalysts can be divided into to form H-form and Na-form, which is convenient to interpret IR result of adsorption on basic site .