CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The adsorption of metallic mercury in heavy naphtha was studied in a batch system. The experiments were carried out for Beta zeolite (BEA), alumina (Al_2O_3), activated carbon (AC), CuS/Al_2O_3, CuS/BEA as well as CMG273. The activated carbon showed the highest removal efficiency for metallic mercury among these supports. It was clear that the surface area and the nature of surface such as polarity are important for the removal efficiency. The CuS adsorbents and CMG273 were successful to remove metallic mercury, more than 90% removal were achieved, due to chemisorption that takes place. Adsorption kinetic studies showed that the pseudo second order rate equations were able to provide a realistic description of adsorption kinetics of metallic mercury. While Boyd plot confirmed that external mass transfer was the slowest step in the adsorption process. Isotherm studies indicated that the Langmuir model was found suitable to describe the adsorption equilibrium of metallic mercury. The values of separation factor, R_L were found between 0 and 1, which showed that the adsorption of metallic mercury on all CuS adsorbents was favorable.

In a continuous system, the breakthrough curve showed that CuS/BEA exhibited longer breakthrough time and shorter mass transfer zone than CuS/Al_2O_3.

5.2 Recommendations

From this work, it showed that the CuS adsorbents have affinity to remove metallic mercury from heavy naphtha. To prepare the CuS adsorbent, 2-step precess composing of impregnation method followed by sulfidation method was need. In general, the sulfidation method can be conducted by several sulfiding agents such as a mixture of N_2 and H_2S, a mixture of H_2 and H_2S, dimethyl disulfide (DMDS), dimethyl sulfide (DMS), tertiarybutyl polysulfide (PSTB), and teriarynonyl polysulfide (PSTN). Therefore, the effect of different sulfiding agents on the Hg° adsorption efficiency should be studied.