

CHAPTER V

CONCLUSIONS AND RECOMMENDATION

Microwave-induced thermal conversion of EVA/NR was studied and gaseous products from the operation were investigated. The effects of microwave power, reacting gas (atmosphere in operation), and silicon carbide ratio on the proportion of products and the responding of both permanent and hydrocarbon gas products were studied. Products and operation were compared with electrical furnace which using same quartz reactor, quantity, reaction time, and atmosphere at 700 °C. The following is a summary derived from this research.

1. Microwave heating can generate heat with higher rate than electrical furnace heating. Therefore, the time to start and stop the operation in shorter time and do not have heat residue after stop the operation. The higher heating rate of microwave heating due to microwave power.
2. Gas products content increased with the increased of microwave power but solid product content decreased. Hydrocarbon gas and permanent gas (H_2 , CO_2 , and CH_4) production significant increased with higher microwave power especially at 550 watt microwave power the rate of production of gas is highest.
3. Effect of reacting gas is dominated in microwave heating than in electrical furnace heating. When O_2 appears in the atmosphere, the gasification reaction of heavy hydrocarbon gas, solid residue, and oil was favor that can be seen from higher contents of H_2 , CO_2 , CH_4 , and light hydrocarbon that were converted from heavy hydrocarbon. In contrast, the reacting gas without O_2 produced the lower contents of previous gaseous.
4. The effect of silicon carbide ratio is not prominent due to the limitation of microwave radiation distribution in microwave oven. All of the experiments, the qualitative composition of products are the same regardless of the ratio of silicon carbide

Recommendation

From this research, many problems occurred during the operation, thus the recommend for further studied be summarized by follow as.

1. The microwave oven should have multimode apparatus to generate a standing wave pattern where more uniform radiation may be achieved as compared to this research that utilized single mode microwave oven.
2. Temperature measurement during the operation was very difficult because of arching phenomenon that can initiate hot spot on thermocouple. Thus microwave oven should be designed for comfortable temperature measurement by infrared pyrometer.
3. For future studied, solid and oil products from microwave heating should be studied to compare with electrical furnace heating, investigate effect of microwave heating on the properties of solid residue, and modified carbon solid residue to activated carbon.