HYDROGEN FROM AMMONIA IN THE MICROWAVE REACTOR SYSTEM USING MOLYBDENUM INCORPORATED CATALYSTS

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ABSTRACT
In this study, molybdenum incorporated catalysts were used for ammonia decomposition reaction in the microwave reactor system. The wet impregnation procedure was applied to synthesize the catalysts using alumina and mesoporous carbon as the support materials. Several characterization techniques, to determine the properties of the catalysts, such as ICP-OES, X-Ray Diffraction, Nitrogen Physisorption, Transmission Electron Microscopy, Raman Spectroscopy were done. In the microwave heated system, catalytic activity tests were carried out between 250-600°C using pure ammonia flow of 36000 ml/gcat.h. For carbon support, all catalysts achieved nearly total conversion at 450°C and alumina supported catalysts reached the total conversion at 400°C. It was observed that alumina support has given higher conversion than carbon support, at lower reaction temperatures.

EXPERIMENTAL STUDIES

Catalyst Preparation

RESULTS AND DISCUSSION

Activity Results Obtained From Alumina Supported Catalysts

Activity Results Obtained From Carbon Supported Catalysts

CONCLUSION

• Molybdenum incorporated mesoporous carbon and alumina catalysts were synthesized and activity tests were done in microwave reactor system.
• Results proved that higher conversion values reaching to total conversion were achieved at lower reaction temperature in microwave reactor system, compared to the conventionally heated reactor system.
• Among the supports, alumina supported catalysts showed better activity.
• Microwave energy makes some changes in the structure of the catalysts, such as the formation of carbide species.

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REFERENCES