

HDPE プラスチック廃棄物からの水素およびカーボンナノチューブ生成に向けた マイクロ波照射条件の調査

Investigation on Microwave Irradiation Condition for Hydrogen and Carbon Nanotubes Production from HDPE Plastic Waste

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HDPE (high-density polyethylene) is a plastic material used in milk jugs, shampoo bottles, water bottles, and other containers. Excessive use of HDPE has a negative impact on the environment and causes a decrease in soil and water quality. Unfortunately, only 29.3% of HDPE waste has been recycled¹. The importance of innovation in recycling

HDPE plastic waste into high-value materials has become a concern for many researchers in the last decade. Pyrolysis and gasification methods to convert HDPE plastic waste into hydrogen and carbon nanotubes have been done in previous research². By using the conventional method, expensive alloys with high temperatures and high energy consumption are required. However, microwave heating provides a low-temperature and one-step process for hydrogen and carbon nanotube

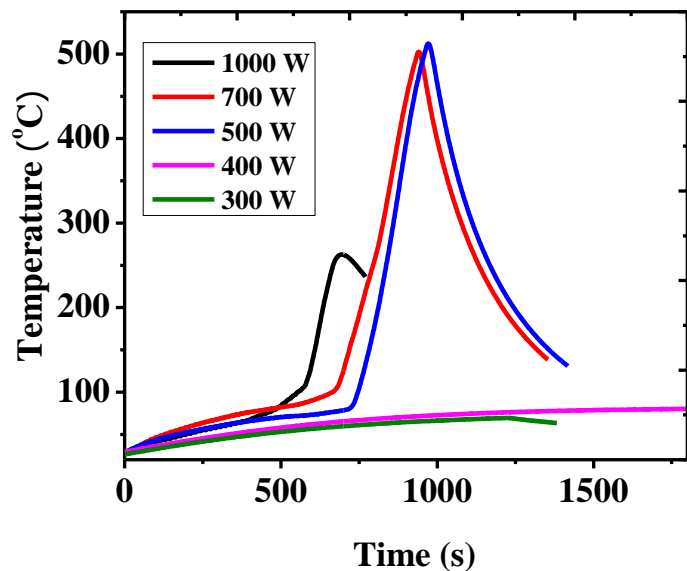


Fig 1. Microwave irradiation power dependence on heating characteristics of HDPE plastic waste and catalyst.

production³. The amount of hydrogen gas and the growth of carbon nanotubes depend on the heating characteristics so that information related to the dependence of irradiation power on the resulting product needs to be investigated to produce the best results in production. This study used a multi-mode applicator which provides convenience in investigating the dependence of power on the production of hydrogen gas and carbon nanotubes. Fig 1 shows the heating characteristics of the HDPE sample mixed with a catalyst for various irradiation powers. The amount of hydrogen gas and growth of carbon nanotubes for each irradiation power will be investigated and reported.

REFERENCES

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