

Micro-thermoelectric Hydrogen Sensor

We have demonstrated the performance of a newly-designed micro-thermoelectric hydrogen sensor. Integration of thermoelectric thin film of SiGe and ceramic catalyst into a micro hot plate on a thin membrane has improved its performance, allowing for detection of a wide-range concentration of hydrogen in air from 0.5 ppm to 5 v/v %.

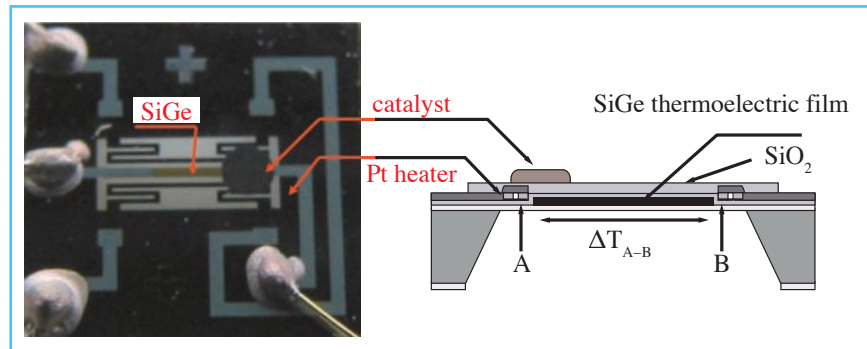


Figure : Left; photograph of micro-thermoelectric hydrogen sensor with the ceramic catalyst deposited on the membrane. Right; schematic of the sensor structures of microheaters.

Woosuck Shin

Advanced Manufacturing
Research Institute

w.shin@aist.go.jp

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Microwave-assisted Polyester Synthesis

Rapid synthesis of aliphatic polyesters by direct polycondensation, which does not generate any wastes, is an ideal method for producing polyesters. We report a rapid, environmentally-benign, solvent-free method for synthesis of poly(butylene succinate) (PBS) and poly(lactic acid) (PLA) through microwave irradiation in the presence of tin catalyst. The microwave irradiation accelerated the polymerization rate more than 10 times compared with the conventional heating method. PBS with average molecular weight (M_w) of 29000 and PLA with M_w of 16000 were obtained within 30 minutes.

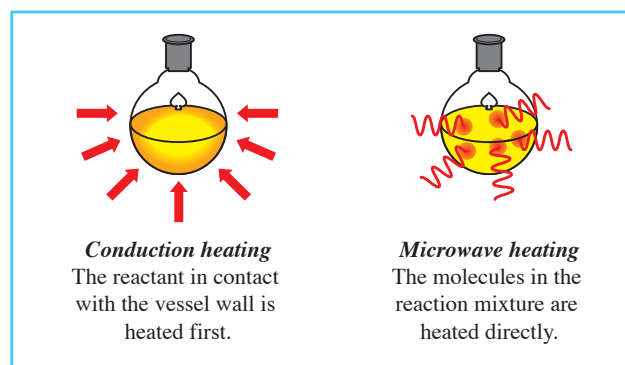


Figure : Schematic of sample heating by conduction versus microwave

Ritsuko Nagahata

Research Institute for Innovation
in Sustainable Chemistry

nagahata-ritsuko@aist.go.jp

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