

## SEMICONDUCTOR MICROWAVE CHEMICAL REACTOR WITH AN ELLIPTIC FOCUSED CHAMBER

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A compact-sized system with a semiconductor HPA microwave source and an elliptic focused chamber was newly developed for chemical reactions. The developed system consists of ① Semiconductor HPA microwave generator, ② Elliptic focused chamber as a chemical reactor, ③ Temperature controlling part and ④ Controller system. Semiconductor HPA has the following properties: 1. High-purity sine type microwave, 2. Variable power control, output 0 to 200 W, 3. m sec.-interval operation, 4. Frequency stability: 2450 MHz  $\pm$  25 Hz. 5. Lifetime is longer than 50,000 h.

A compact-sized elliptic chamber for test tube makes use of electromagnetic field concentration through an elliptic focus and irradiates microwave efficiently to the sample in the test tube. In the chamber, a microwave absorbance efficiency of more than 96 % was experimentally demonstrated for water or several types of samples at room temperature. Temperature is monitored by an optical fiber thermometer and controlled by PID control method. Data are updated at 1 sec. interval and temperature accuracy is  $\pm 0.5$  °C. Temperature control signals are feed backed to semiconductor HPA.

The compact-sized desktop system is easy to assemble/disassemble, because of the connection of units with coaxial cables. With respect to the equipment protection, the system equipped with a fail-safe mechanism will automatically stop against every eventuality. It is demonstrated that several types of chemical reactions efficiently proceed in this system.

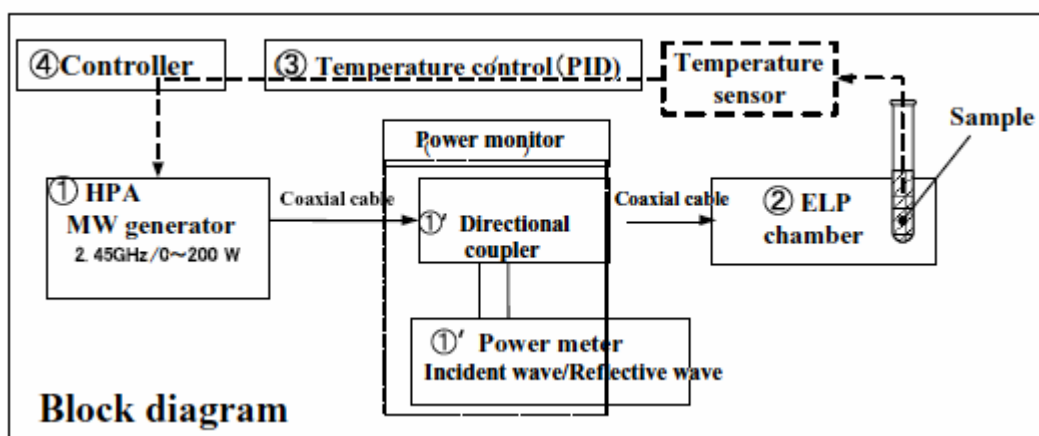


Figure 1. Block diagram of semiconductor microwave chemical reactor