Thesis Title	Numerical Simulation of Thermoelectric Conversion by Cyclic Flow Reversal Combustion in a Porous Medium
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Abstract

A study of mathematical model to produce electric power has been presented by using thermoelectric device that is joining the end of two difference type of semi-conductor(Junction). A new concept of thermoelectric device has been developed by using cyclic flow reversal combustion in porous medium (CFRC), in which high power generation is produced due to the temperature gradient maintained by the CFRC. The result of mathematical model in this reserch was divided in two part, the first one considered when single thermoelectric was located at the middle of system and the second one considered the system that used thermoelectric module instead of porous medium. Attention was focused on the influence of the dominating parameters, i.e., optical thickness(τ), equivalence ratio(Φ), gas velocity(u), effect of half period(t_{hp}), external resistance(R') and internal resistance(r). The result of both part showed power output and conversion efficiency were depended on Φ and u, and had maximum value at R'=1.2 ohm. The first one's compared with the experimental were made so as to investigate the validity of the proposed model. The results agreed qualitatively with available experimental results. In the second one power and conversion efficiency were increased when increasing τ and decreasing internal resistance. The result revealed that the conversion efficiency in the second one was 2 times higher than the first one.

Keywords : Thermoelectric Device / Combustion / Porous Medium