THERMOELECTRIC ENERGY CONVERSION IN DEVICES OF CLOSED TYPE

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Abstract: The possibility of creating closed-type pulsed generators of electricity on the base of thermoelectric modules is demonstrated. In the generators, chemical energy is directly converted to electricity due to burning metal powders in air. Contrary to open-type generators with a hot medium flow, in the considered case, almost all chemical energy of fuel combustion can be passed as a heat flux through thermoelectric modules. The possibility of organizing effective diffusion combustion of metal powder under forced convection of oxidizer in the generator assembly of limited dimensions is shown. Preliminary experiments demonstrated the successful operation of a thermoelectric generator with the power of ~ 4 W during 20 min at the load current of ~ 1 A. The pulse-periodic mode of generator operation during periodic heating and cooling of the module is considered, which allows one to increase the average efficiency of converting thermal energy into electrical energy by at least a factor of 1.6.

Keywords: thermoelectric generator; metal burning; magnesium; diffusion combustion

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