

**Название публикации:**

Development of a semitransparent ceramic heat-insulation for an eco-friendly combustion chamber of Low-Heat-Rejection diesel

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**Аннотация:**

Efficiency of diesel has been studied using well-known types of the ceramic heat-insulating HICs- or thermal barrier TBCs-coatings. This problem is relevant for a high-speed diesel combustion chamber in which intensive radiant component (near IR) reaches similar to 50% within total thermal flux. Therefore, in their papers the authors offered new concept of study these materials as semitransparent SHICs-, STBCs-coatings. On the Mie scattering theory the effect of selection of the specific structural composition and porosity of coatings on the variation of their optical parameters is considered. Conducted spectrophotometric modeling of the volume-absorbed radiant energy by the coating had determined their acceptable temperature field. For rig testings coated piston using selected SHIC (PSZ-ceramic  $ZrO_2+8\%Y_2O_3$ ) with a calculated optimum temperature gradient was chosen. A single cylinder experimental tractor diesel was used. At rotation frequency  $n > 2800$  rpm the heat losses were no more than  $0.2 \text{ MW/m}^2$ . Executed testings showed similar to 2-3% lower specific fuel consumption in contrast the diesel with uncoated piston. Effective power and drive torque were similar to 2-5% greater. The authors have substantiated the growth the efficiency of this Low-Heat-Rejection (LHR) diesel due to the known effect of soot deposition gasification at high speed. Then unpolluted semitransparent ceramic thermal insulation forms the required thermoradiation fields and temperature profiles and can affect regulation of heat losses and reduction of primarily nitrogen dioxide generation.

**Ключевые слова:**

Thermal barrier coatings; coefficients