

Название публикации:

Semitransparent ceramic heat-insulation of eco-friendly Low-Heat-Rejection diesel

Авторы:

Merzlikin, VG [1,2]; Gutierrez, MO [3]; Makarov, AR [4]; Kostukov, AV [1]; Dementev, AA [1]; Khudyakov, SV [2]; Zagumennov, FA [5]

[1] Moscow Polytech Univ, Dept Power Plants Transport & Small Scale Power G, Bolshaya Semenovskaya St 38, Moscow 107023, Russia

[2] Plekhanov Russian Univ Econ, Dept Ind Econ, Stremyanny Lane 36, Moscow 117997, Russia

[3] Tablet Sch Co, Gen Maldonado & Belisario Quevedo, Latacunga 0501444, Ecuador

[4] RUDN Univ, Dept Mech Engn & Instrument Making, Miklukho Maklaya St 6, Moscow 117198, Russia

[5] Bauman Moscow State Tech Univ, Dept Instrument Prod Tech, 2 Ya Baumanskaya St,5-1, Moscow 105005, Russia

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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 an intensive radiant component (near IR) reaches similar to 50% within total thermal flux. Therefore, in their works the authors had been offering 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, a 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 MW/m². Executed testings showed similar to 2-3% lower specific fuel consumption in contrast to the diesel with an 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 a reduction of primarily nitrogen dioxide generation.

Ключевые слова:

coefficients