

**Название публикации:**

Modeling of the structure of heat-insulating semi-transparent materials and coatings for industrial and transport power plants

**Авторы:**

Merzlikin, V.G.a,b, Zhubreva, T.V.b, Kostukov, A.V.a

a) Moscow Polytechnic University, B. Semyonovskaya str., 38, Moscow, Russian Federation

b) Plekhanov Russian University of Economics, Stremyanniy per., 36, Moscow, Russian Federation

**Наименование журнала:**

Solid State Phenomena

Volume 284 SSP, 2018, Pages 1215-1220

4th International Conference on Industrial Engineering, ICIE 2018; Moscow; Russian Federation; 15 May 2018 до 18 May 2018; Код 219259

**Аннотация:**

The influence of optical characteristics of semitransparent thermal barrier coatings (TBC) on thermal regulation of heat-stressed elements of power plants is studied. There was used the developed by the authors methodology of physical and mathematical simulation of thermoradiational (in the range 1-2  $\mu\text{m}$ ) and conductive heat transmission in ceramic thermal insulation of chamber combustion inner walls of a diesel engine. The paper discusses temporal temperature regimes in model two-layer TBC-coatings in the form of a selectively scattering and absorbing (in the near infrared range) ceramic heat-insulating layer, deposited on the bonding sublayer (with boundary reflection) of the internal surface of the combustion chamber of Low Heat Rejection diesel. Spectrophotometric measurements of the optical parameters have ensured estimates of optical and thermal fields of the investigated ceramics, the structural composition of which was determined on the basis of  $\text{ZrO}_2+8\% \text{Y}_2\text{O}_3$ . For typical values of radiant-convective flux up to 1-2  $\text{MW}/\text{m}^2$  (effecting on heat-stressed elements of heat-insulated combustion chamber of a diesel engine in pulse-periodic regime) optical and structural parameters TBC-coatings that ensure control and superintendence of the ceramic layer surface temperature and its temperature gradient were proposed. © 2018 Trans Tech Publications, Switzerland.

**Ключевые слова:**

Absorption, Heat-insulation, Scattering, Semitransparent thermal barrier coating, Subsurface radiant heating