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COMBUSTION OF A TWO-PHASE FUEL DROPLET CONTAINING CARBON PARTICLES IN
WEIGHTLESSNESS**Abstract**

For increasing thermal efficiency of fuel burning, carbon powder could be mixed with liquid fuel. This mixture being injected into combustion chamber forms two-phase droplets, containing both liquid phase and solid particles. Burning of such a two-phase droplet needs a peculiar model. Carbon particles being surrounded by liquid hydrocarbon cannot burn due to the relatively low temperature of fluid. Gradual evaporation of liquid fuel and formation of a diffusion flame could bring metallic particles to the surface, where they could be heated and enter into heterogeneous reaction with oxidant. The surface fraction of solid particles would grow on evaporating the liquid. Thus the free surface of liquid contributing to evaporation, drastically decreases. On the other hand, surface energy release due to heterogeneous chemical reactions on the surface of particles would increase the heat flux spent for fluid evaporation. All these processes should be taken into account in developing models for two-phase droplets burning in weightlessness. The present research presents a new model of two-phase droplets burning in weightlessness. The present investigation was supported by Russian Foundation for Basic Research (RFBR project code 18-07-00248)