

## SMOKY PLASMA IN A DUST FLAME

*N.I. Poletaev, A.N. Zolotko,  
Yu.A. Doroshenko, M.E. Khlebnikova*

Institute of Combustion and Advanced Technologies,  
I.I. Mechnikov Odessa National University  
(2, Dvoryanskaya Str., Odessa 65082, Ukraine;  
e-mail: *incomb@ukr.net*)

### S u m m a r y

The results of experimental investigation of the influence of 0.1÷5.0 mass percent of  $K_2CO_3$  and KCl additives on the dispersion of combustion products, which were obtained by the combustion of an Al gas suspension in a laminar diffusion flame, are presented. The extreme dependence between the average particle size of  $Al_2O_3$  and the additive concentration ( $C_a$ ) was experimentally observed. At the  $K_2CO_3$  additive concentration over 0.5%, the increase in the average particle size of  $Al_2O_3$  ( $d_{10} \sim 50$  nm for  $C_a = 5\%$ ) was observed. It is shown that a change in the character of dependence between the  $Al_2O_3$  average particle size and the concentration of low ionizing additives is due to the interaction between the dust and the ion subsystems of the combustion product plasma in the flame combustion zone. The theoretical calculation of the ion concentration in the system, at which the ion drag force is comparable to the Coulomb force, was done.