

NO_x formations in methane-air combustion under condition of joint processes of chemical kinetics and molecular diffusion

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The problem of NO_x emission in combustion of the temperature jump boundary is numerically solved. This formulation serves for studying processes occurring on the front of laminar diffusion flame motion against the cold background. For the consideration of combustion process a scheme of chemical reaction is developed specially for the analysis of NO_x emission. The scheme contains 196 chemical reactions for 32 mixture components. The numerical solution of such problem is a rather complicated task because there is a great deal of equations and it is an extremely stiff problem. For the integration we used LSODES code package (from the ODEPACK code collection) designed for problems with the Jacoby matrices with the arbitrary sparse structures (the system contains more than 3000 ODE's). Temperature, pressure and initial mixture of the components were the varied parameters of this problem. The results obtained are used in development of an ecologically safe method of natural gas combustion in gas-burning boilers.