INFLUENCE OF CHEMICALLY ACTIVE ADDITIVES ON EMISSION SPECTRA OF THE FLAMES OF HYDROGEN AND DEUTERIUM OXIDATION IN NEAR IR REGION


Band system in the region 852 – 880 nm and bands 670 and 846 nm over pressures 0.1 – 1 atm in the flames of mixtures of hydrogen with oxygen and air has been detected. The system is assigned to overtone transitions of H$_2$O$_2$ (3v$_1$ + $\sigma$) correspondingly arising from the reaction of HO$_2$+HO$_2$–H$_2$O$_2^+$+O$_2$+33.5 kcal/mole. The bands 670 and 846 nm are assigned to overtone transitions of HO$_2$ radical (4v$_1$ + $\sigma$) and (3v$_1$ + $\sigma$) correspondingly arising from the reaction of H+O$_2$(+M)–HO$_2$(+M) + 44 kcal/mole. By this means the extent of energy of these elementary processes is located in vibrational degrees of freedom of products. It has been detected that HO$_2$ radicals occur originally in overtone-excited states in combustion both of hydrogen and deuterium in the presence of small additives of propylene as an inhibitor.