Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Detonation properties of the nitromethane/diethylenetriamine solution[1] VALENTINA MOCHALOVA, ALEXANDER UTKIN, Institute of Problems of Chemical Physics RAS, Tomsk State University, SERGEY LAPIN, Moscow State University — The results of the experimental determination of detonation parameters for the mixture of nitromethane (NM) with diethylenetriamine (DETA) are presented in this work. By the using of a laser interferometer VISAR the stability of detonation waves, detonation velocity and the reaction time with the change of the DETA concentration from 0 to 60 weight percentages were investigated. It is shown that detonation waves are stable up to 25% DETA, and the character reaction time is reduced from 50 ns up to 30 ns with the addition of a few percentages of the sensitizer and then remains almost the constant. With further increase of the DETA concentration the detonation front becomes unstable, and it results in an arising of pulsations with amplitude of 10 microns. The limit concentration of DETA, above which the detonation of the mixture was impossible, was determined. This concentration was equal to 60%. It is shown that the dependence of the detonation velocity on the DETA concentration is non-monotonic. In particular, the increase of detonation velocity in the vicinity of small concentrations of the sensitizer, about 0.1%, was recorded.

[1]The work was supported by Russian Foundation for Basic Research (Project 15-03-07830)

Vasily Zhakhovsky
All-Russia Research Institute of Automatics

Date submitted: 30 Jan 2015 Electronic form version 1.4