ZND detonation of hydrogen and oxygen

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1 Introduction

This report contains information about ZND detonation model of hydrogen and oxygen mixture. The study bases on the dependence of detonation cell size and induction time. Program that is used for analysis, calculates the induction time which is usually considerate to equal zero.

2 Mathematical model

ZND code has been downloaded from Caltech website, it's program calculating simple detonation, has been published for the first time in 1944.
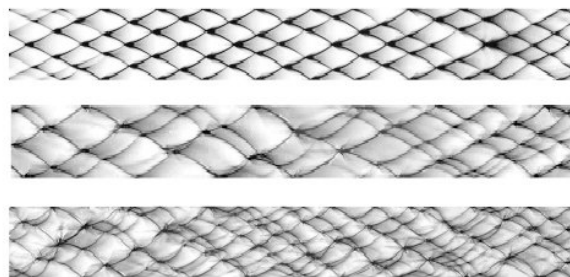

Figure 1: Prediction of detonation cell size from chemical kinetics computation.
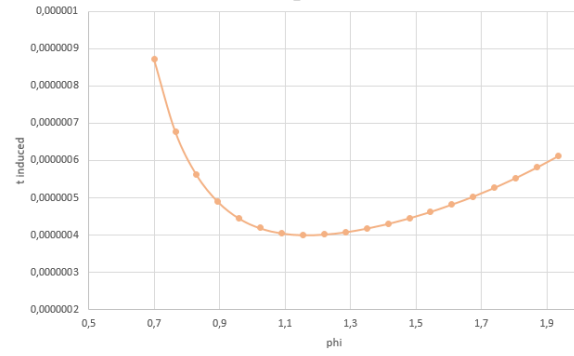
3 Results

Figure 2: The result of program calculation - ZND detonation.
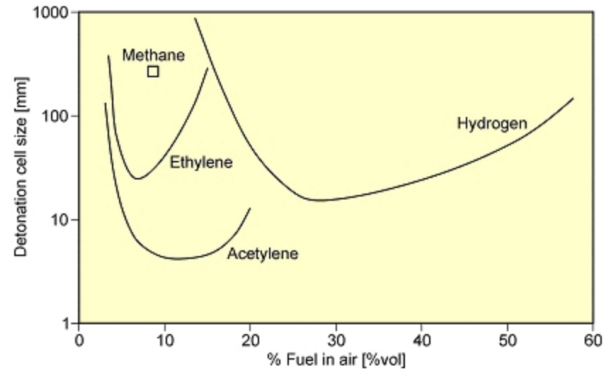

Figure 3: Experimental data [1].

The shape of these two charts is similar because of the relation:

$$a = \frac{t_{ind}}{\lambda} = \frac{7,77 * 10^{-8}}{0,0121} = 6,65 * 10^{-6} \qquad (1)$$

4 Summary

Because of the immense magnitude of the velocity of the detonation the experiment is called Knallgas. Calculations are influenced by idealized conditions of experiment, although they are similar to the experiment data.

5 References

http://www.hysafe.net/wiki/BRHS/ChemicalPropertiesOfHydrogen [1]
$http://shepherd.caltech.edu/EDL/public/cantera/html/SD_Toolbox/$ [2]
http://engine.princeton.edu/users/eddie/1d.htm [3]