Mixture of hydrogen and oxygen combustion in air and in oxygen comparison

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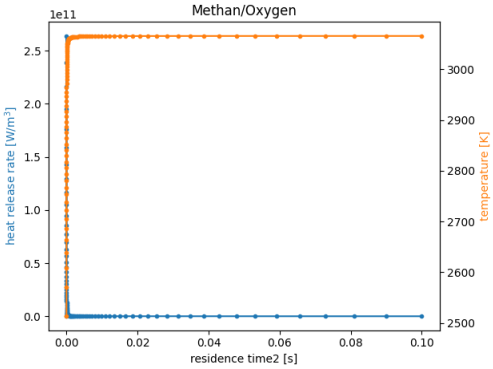
1 Introduction

This project raises the issue of combustion of a mixture of methane and hydrogen in air and oxygen. Below we present the combustion results for various initial conditions. After deep researches, it is claimed that this project might be the only one raising this issue.

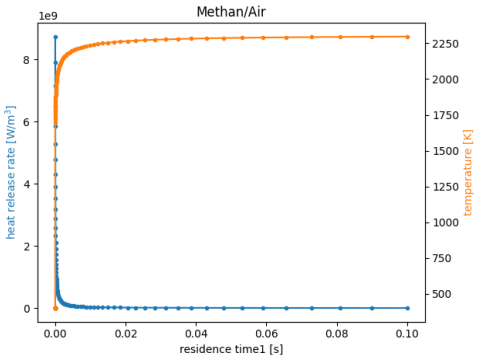
2 Calculations and Graphs

2.1 Equivalence ratio = 1

2.1.1 Temperature = 400K; pressure = 101325 Pa CH4:H2 ratio is 1:1

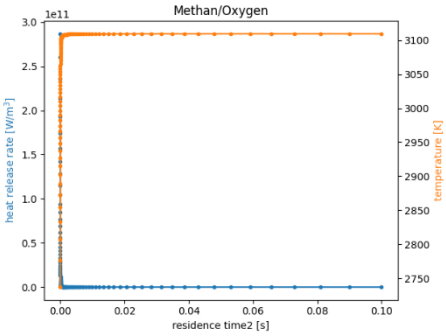


Oxygen

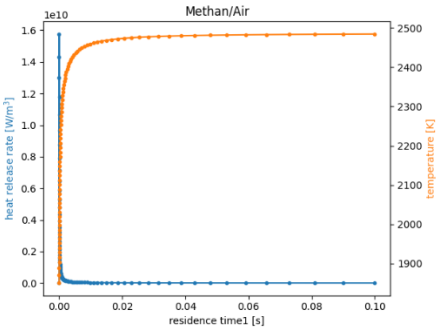


Air

2.1.2 Temperature = 800K; pressure = 101325 Pa CH4:H2 ratio is 1:1

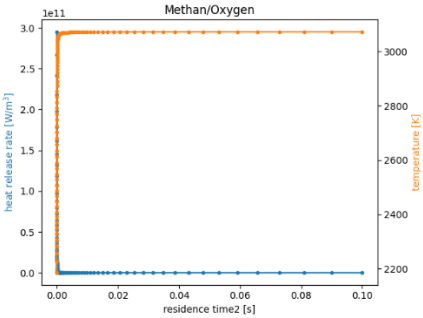


Oxygen

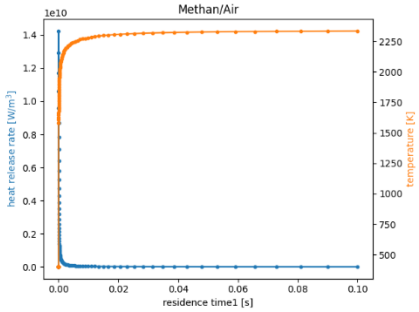


Air

2.1.3 Temperature = 400K; pressure = 101325 Pa CH4:H2 ratio is 1:3

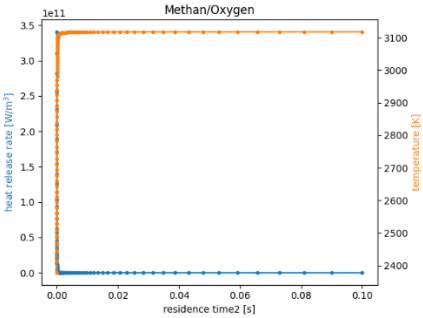


Oxygen

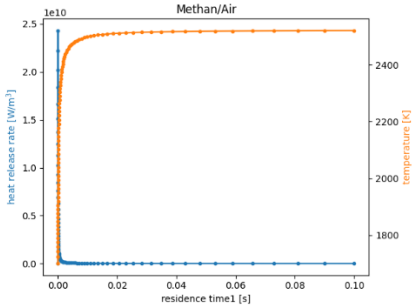


Air

2.1.4 Temperature = 800K; pressure = 101325 Pa CH4:H2 ratio is 1:3

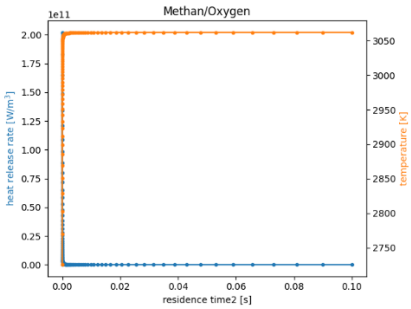


Oxygen

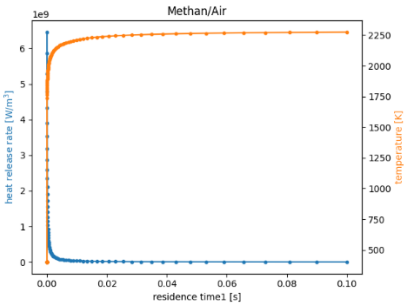


Air

2.1.5 Temperature = 400K; pressure = 101325 Pa CH4:H2 ratio is 3:1

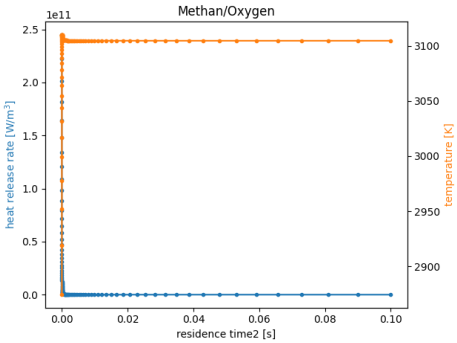


Oxygen

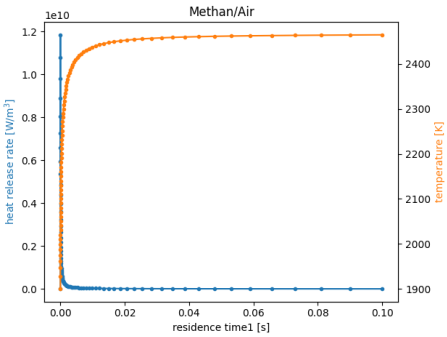


Air

2.1.6 Temperature = 800K; pressure = 101325 Pa CH4:H2 ratio is 3:1



Oxygen



Air

3 Conclusion

After deep analysis of these calculations and graphs there are several conclusions:
First of all combustion is possible for all given parameters.
Second the combustion temperature is always higher when burning in oxygen than in air.
Third the heat release rate is always higher when burning in oxygen than in air.