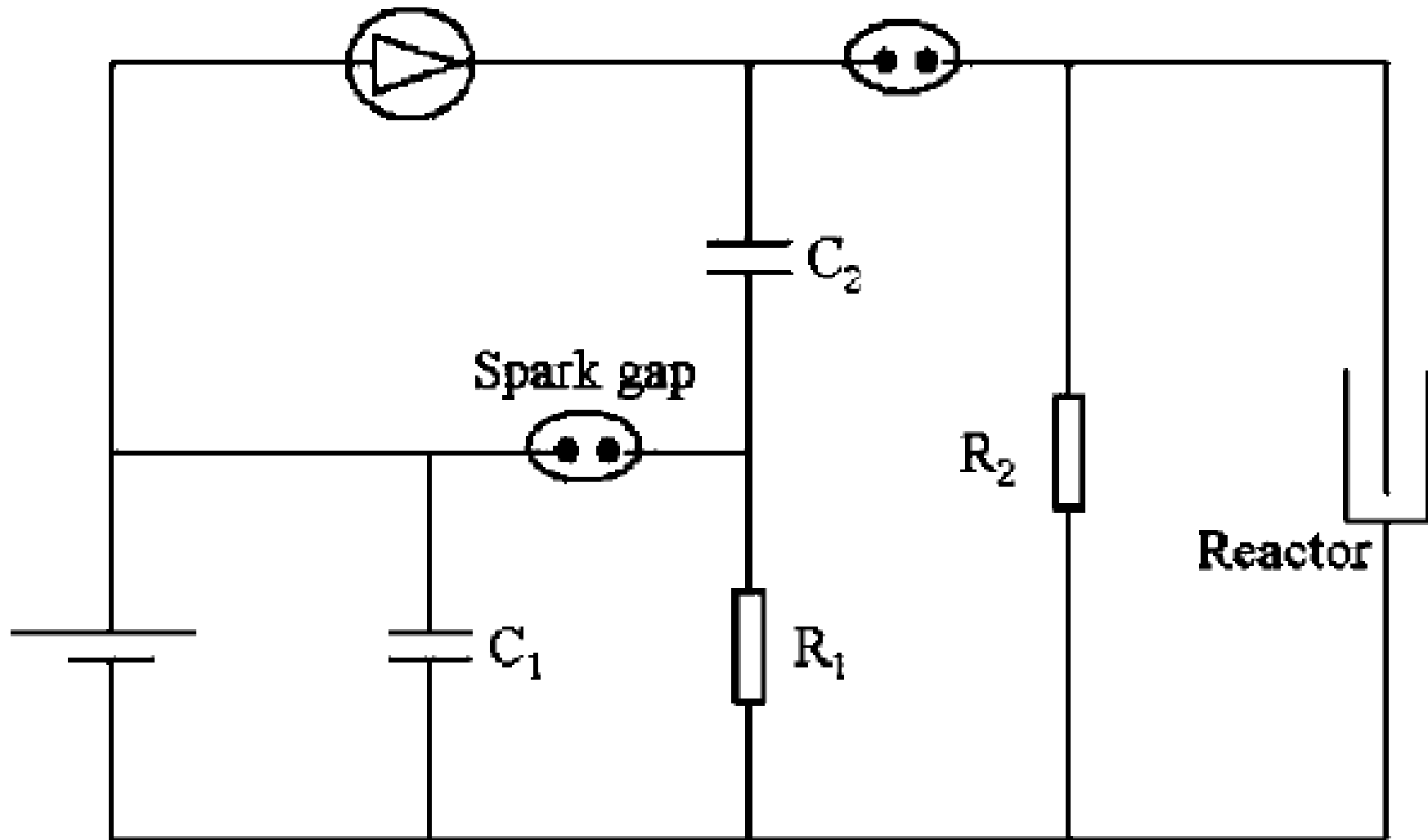


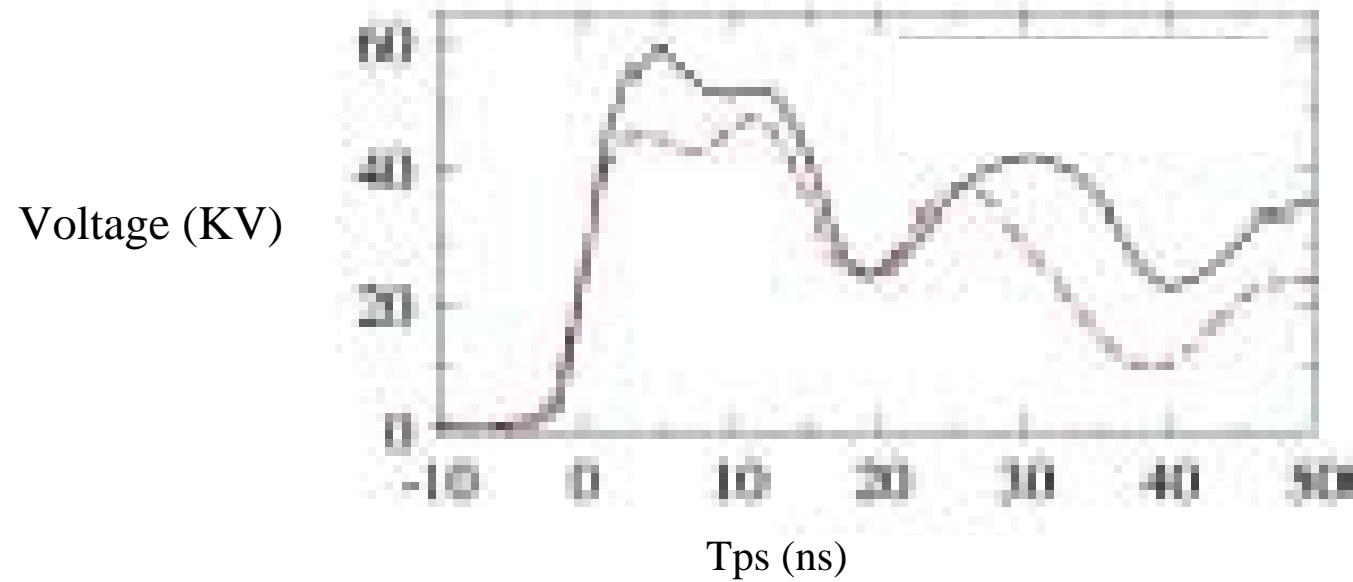
**COMBUSTION ASSISTEE PAR PLASMA**  
**CHIMIE DES PLASMAS HORS EQUILIBRE**

Pierre VERVISCH

Schematic diagram of a two stage Marx generator using spark gaps.



## Voltage wave form with and without a corona reactor.

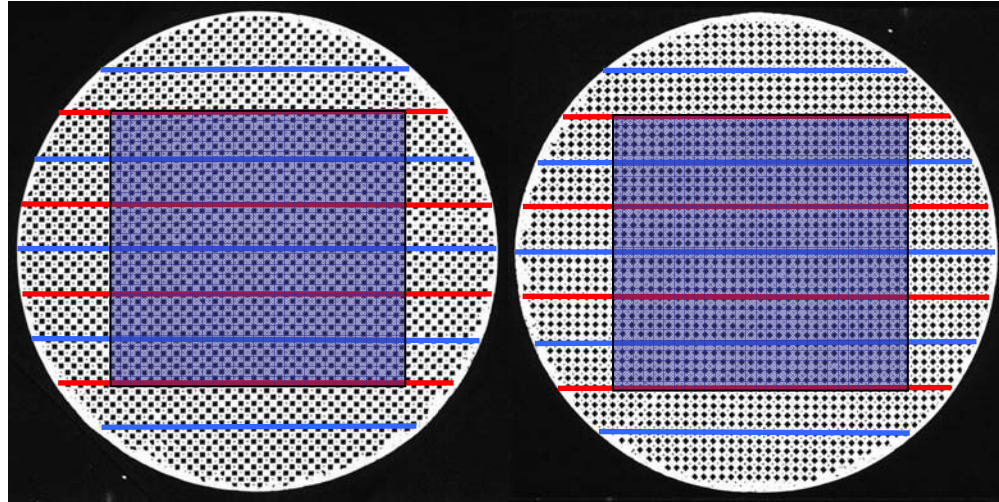
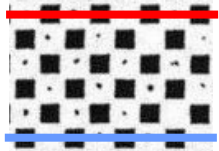


# Application des décharges nano secondes au Coria

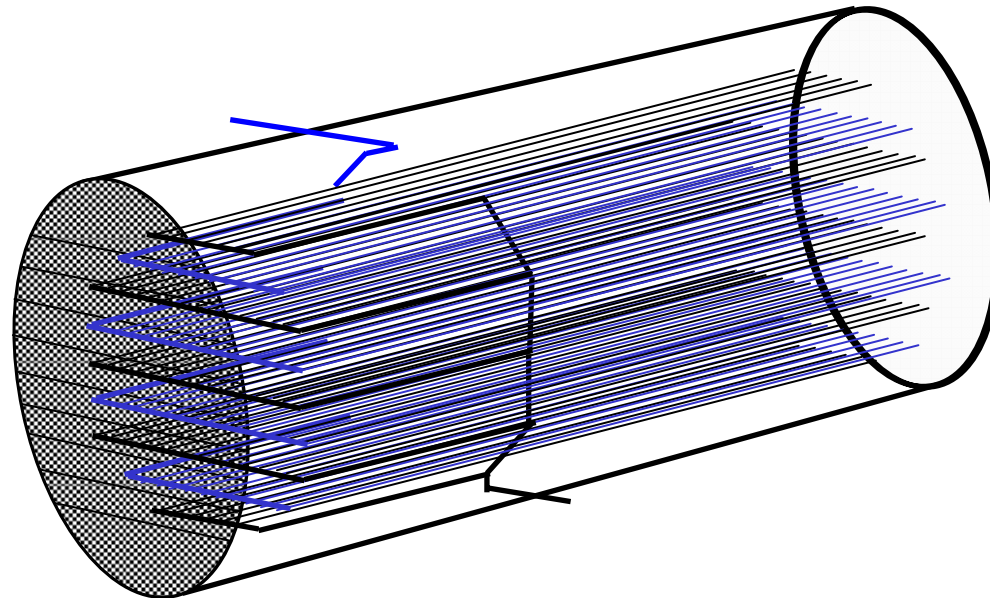
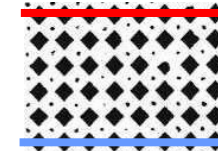
- **Traitement des effluents gazeux: VOC et suies**
- **Allumage d'un mélange combustible**
- **Contrôle de flamme**

## Destruction des suies à l'échappement automobile

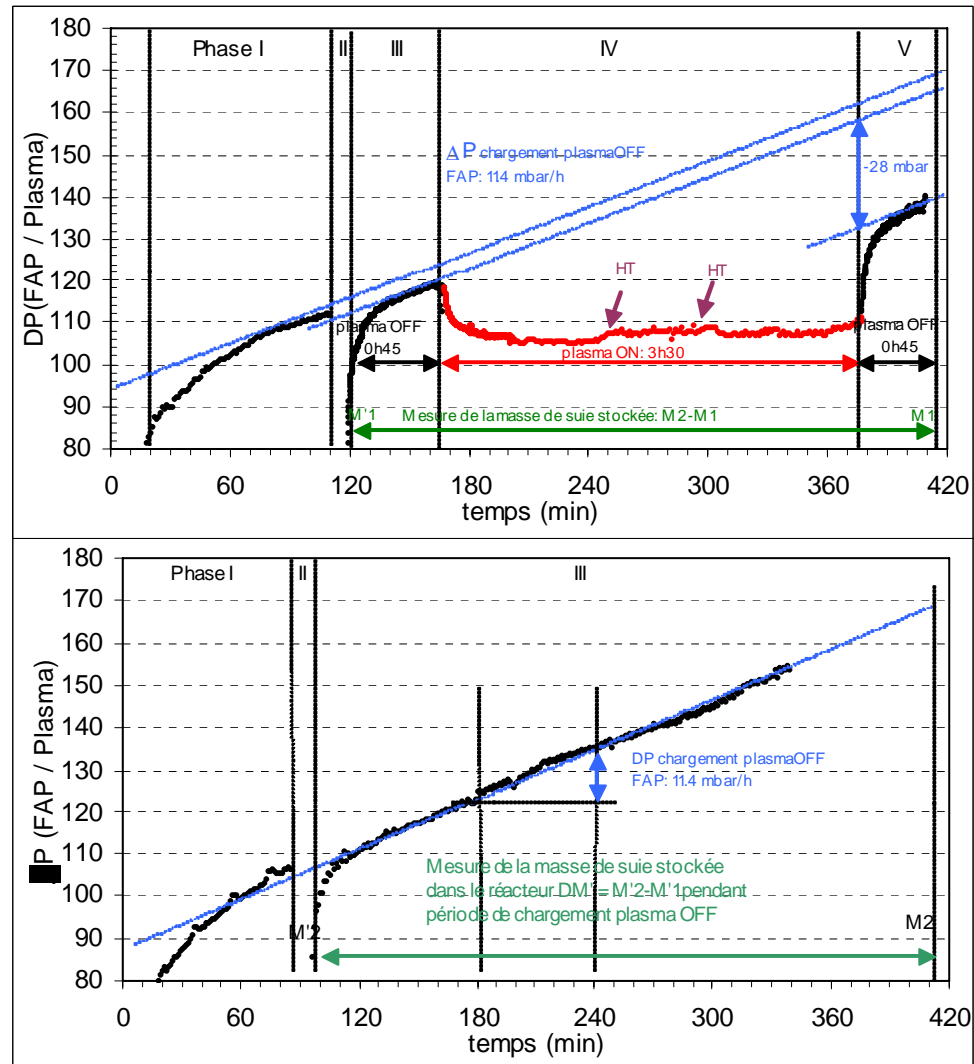
**Configuration  
plan / carré  
88mm\*88mm**



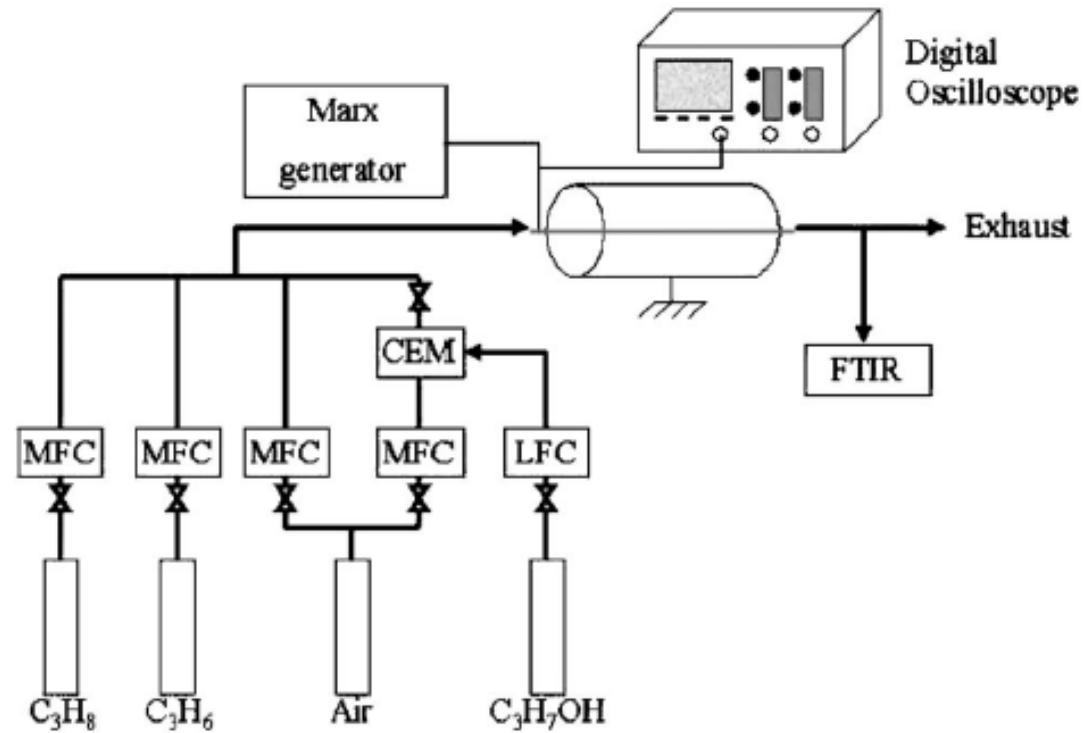
**Configuration  
plan / losange  
88mm\*88mm**



# Destruction des suies à l'échappement automobile

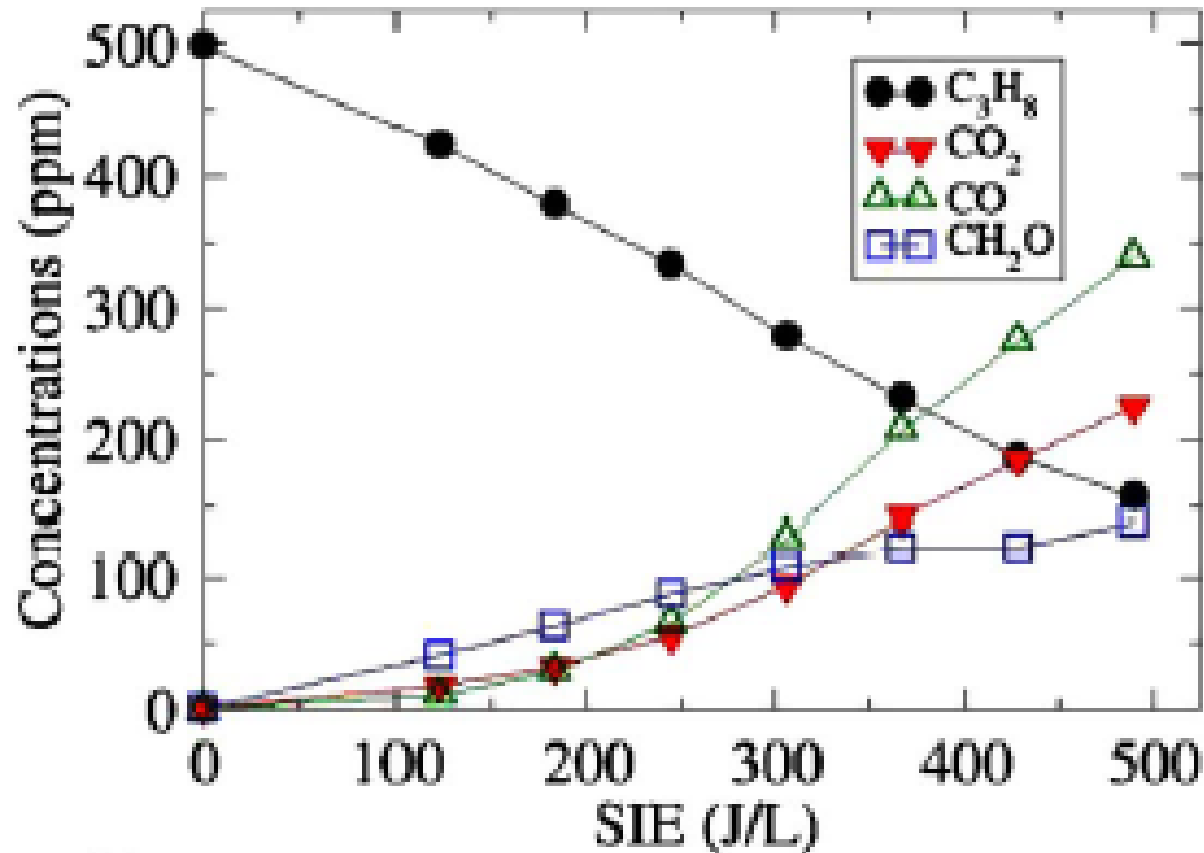


## Destruction des VOC



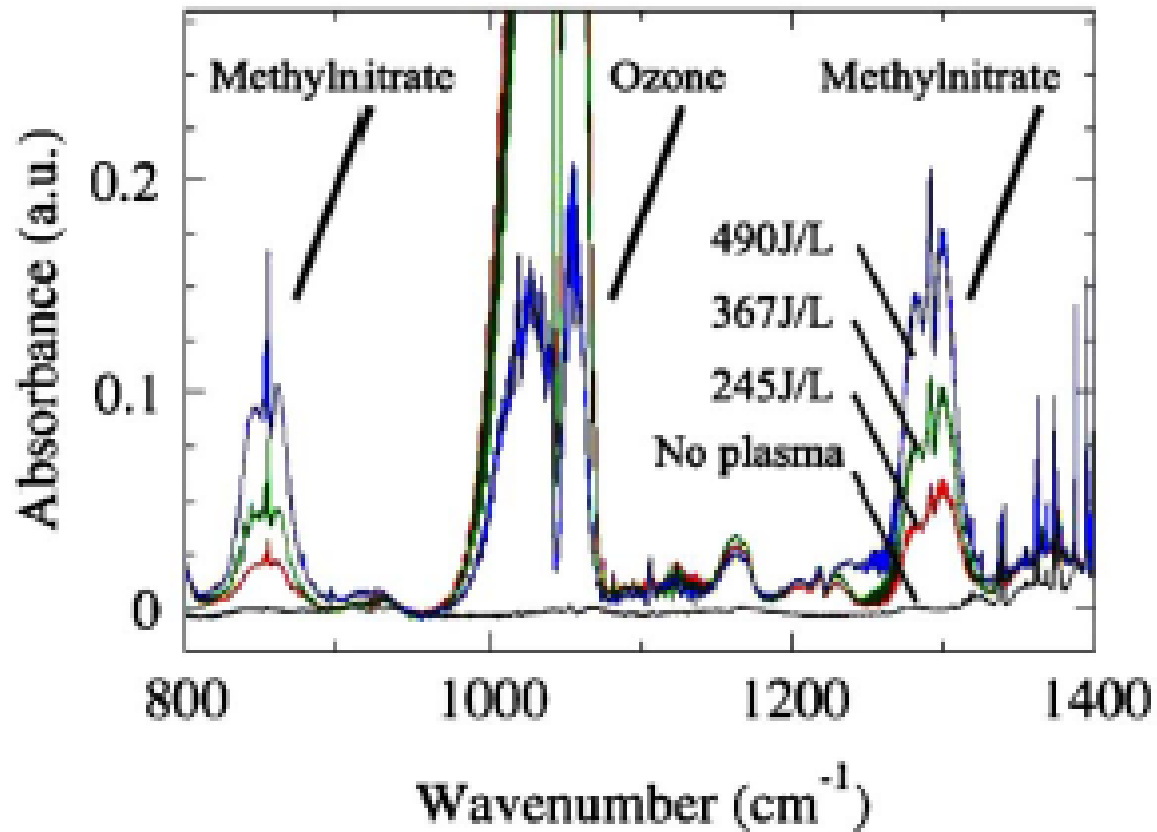
Schematic diagram of the experimental setup.

## Destruction des VOC



*Evolution of propane and its main by-products as a function of specific input energy during nonthermal plasma treatment.  
Output concentrations*

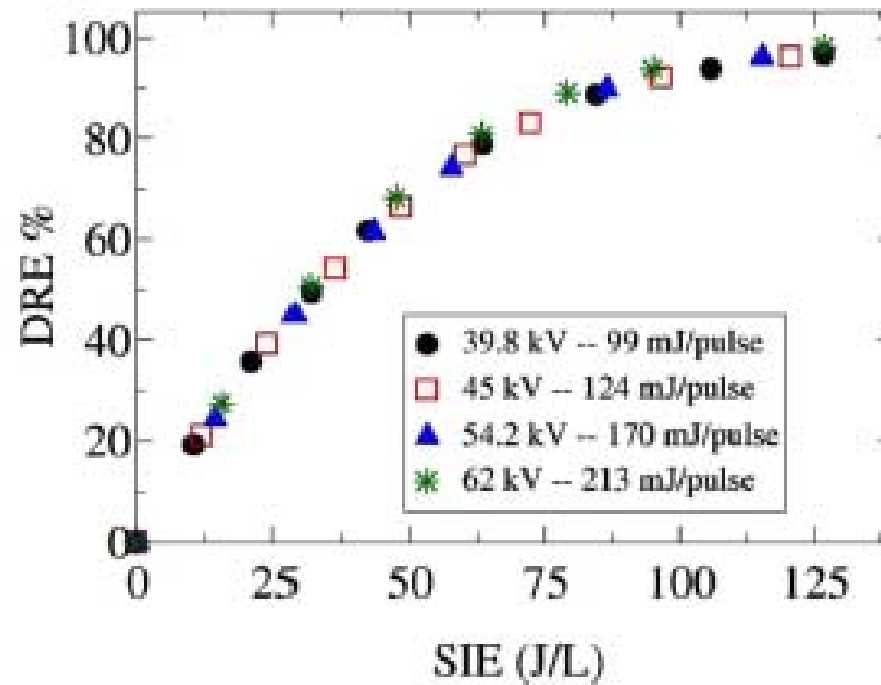
## Destruction des VOC



*Evolution of propane and its main by-products as a function of specific input energy during nonthermal plasma treatment.*

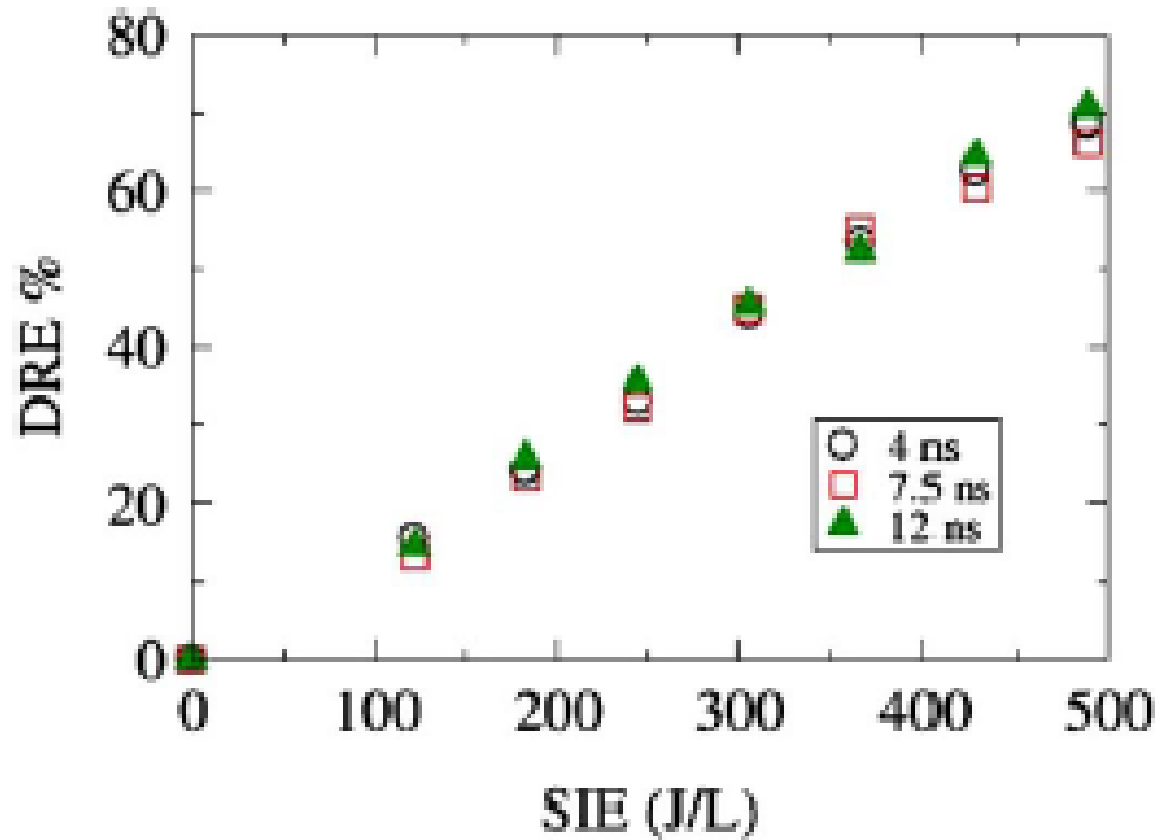
*FTIR spectra from 800 to 1400  $\text{cm}^{-1}$ .*

## Destruction des VOC



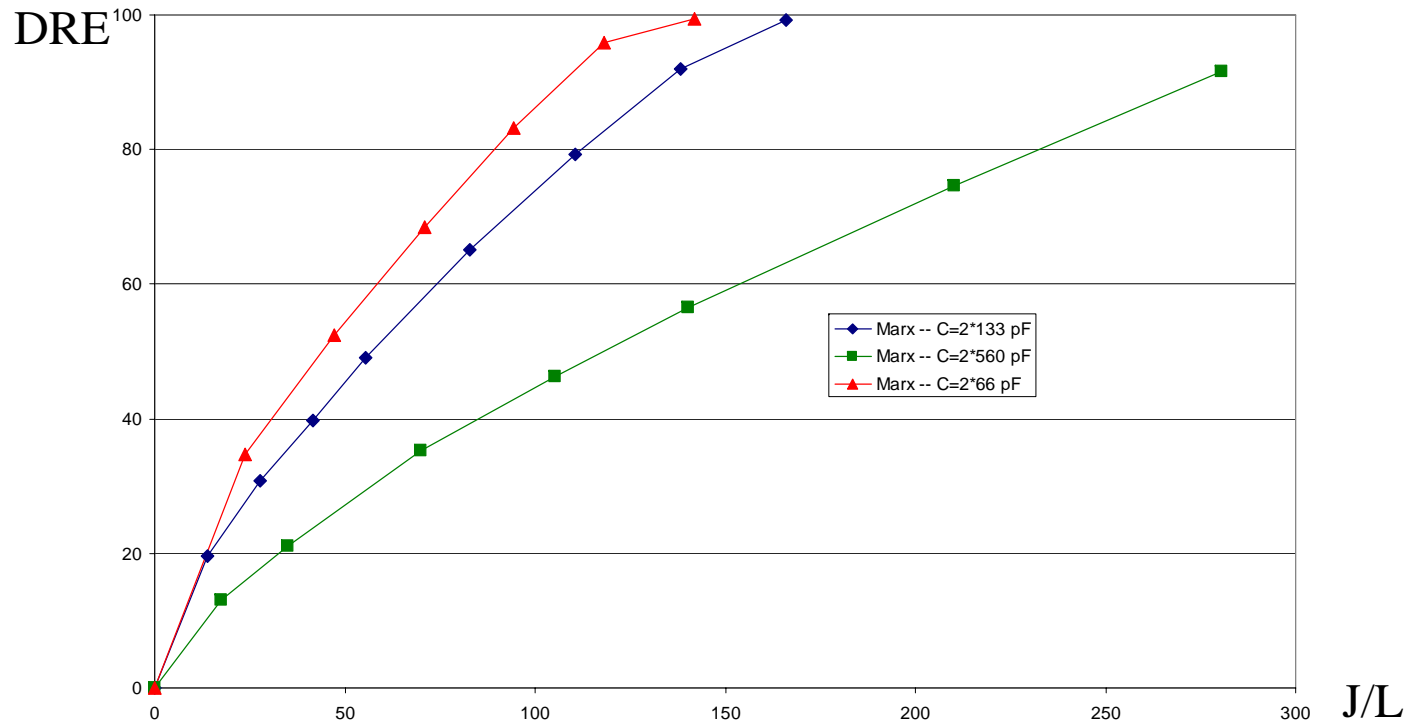
*Effect of the applied voltage on the destruction and removal efficiency of propene as a function of pulse repetition frequency*

## Destruction des VOC



*Effect of pulse rise time on the destruction and removal efficiency of propane as a function of specific input energy.*

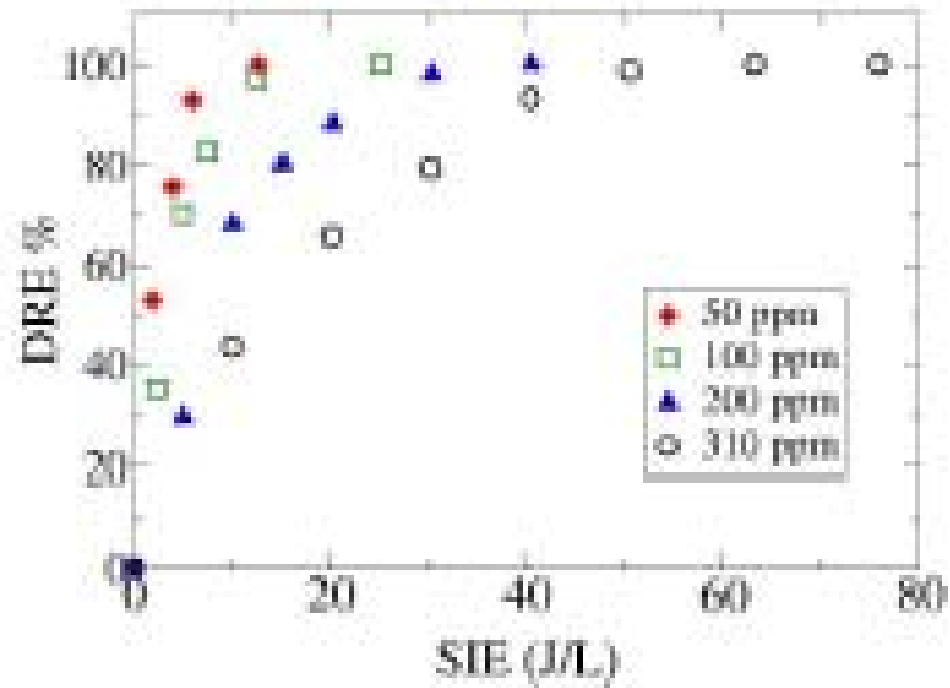
# Destruction des VOC



*Influence de la réserve de charge sur l'efficacité de destruction*

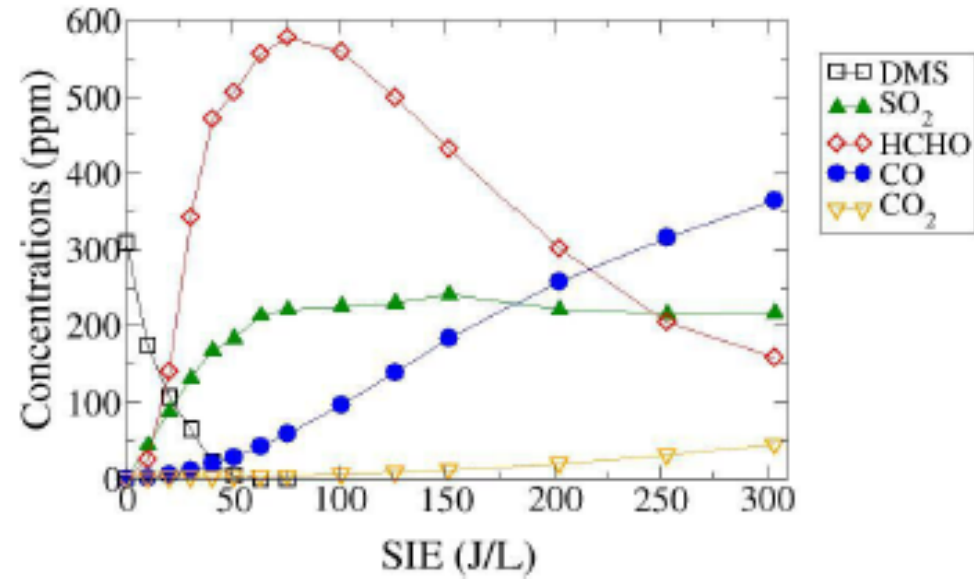
*500 ppm de NO dans N2*

## Destruction des VOC



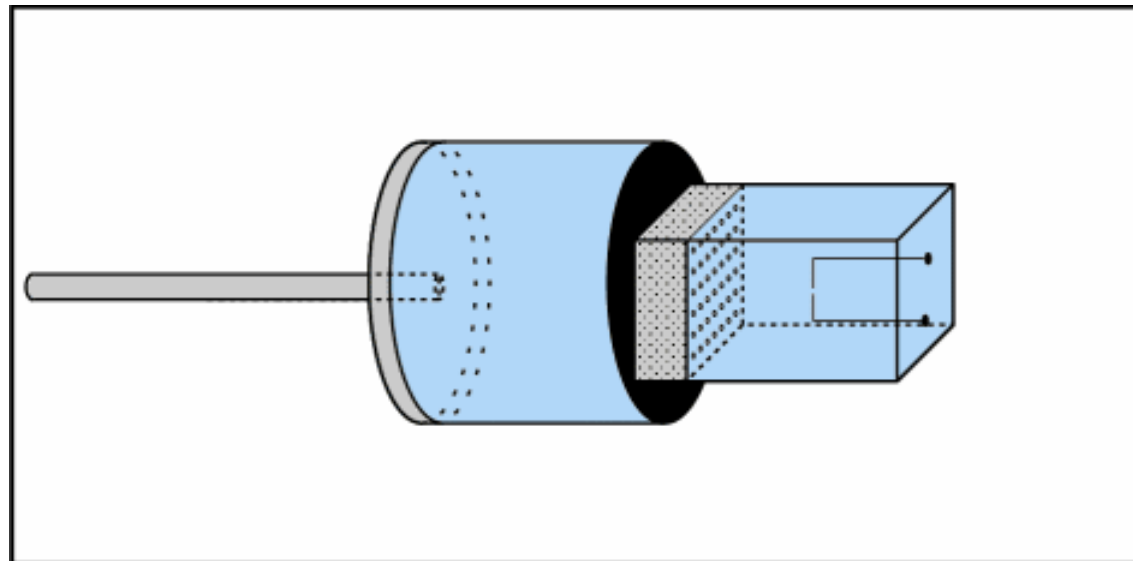
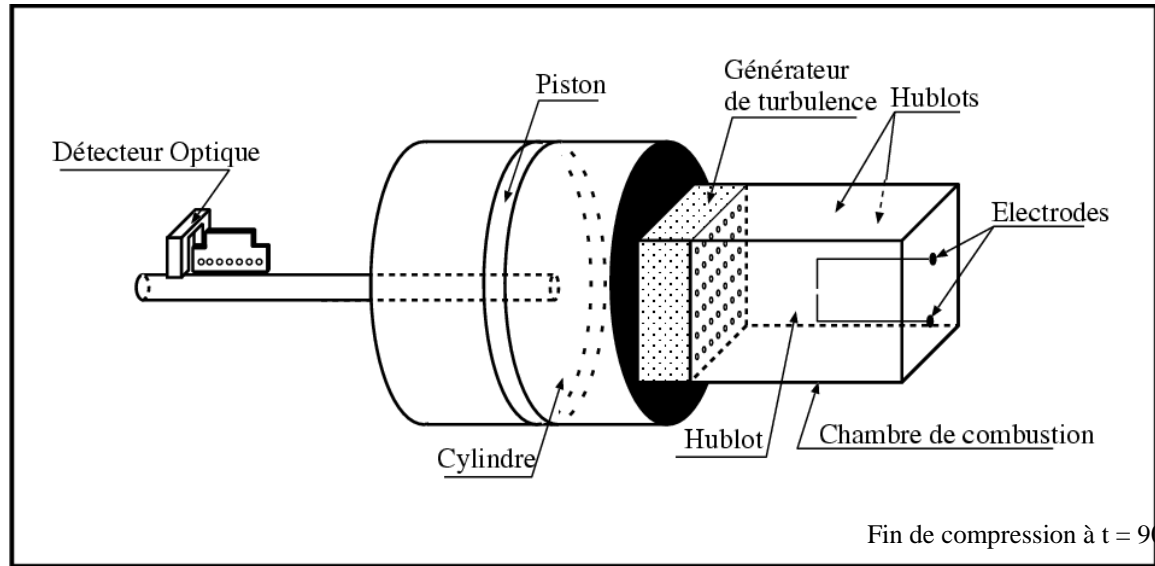
*Dependence of dimethyl sulfide removal efficiency*

## Destruction des VOC

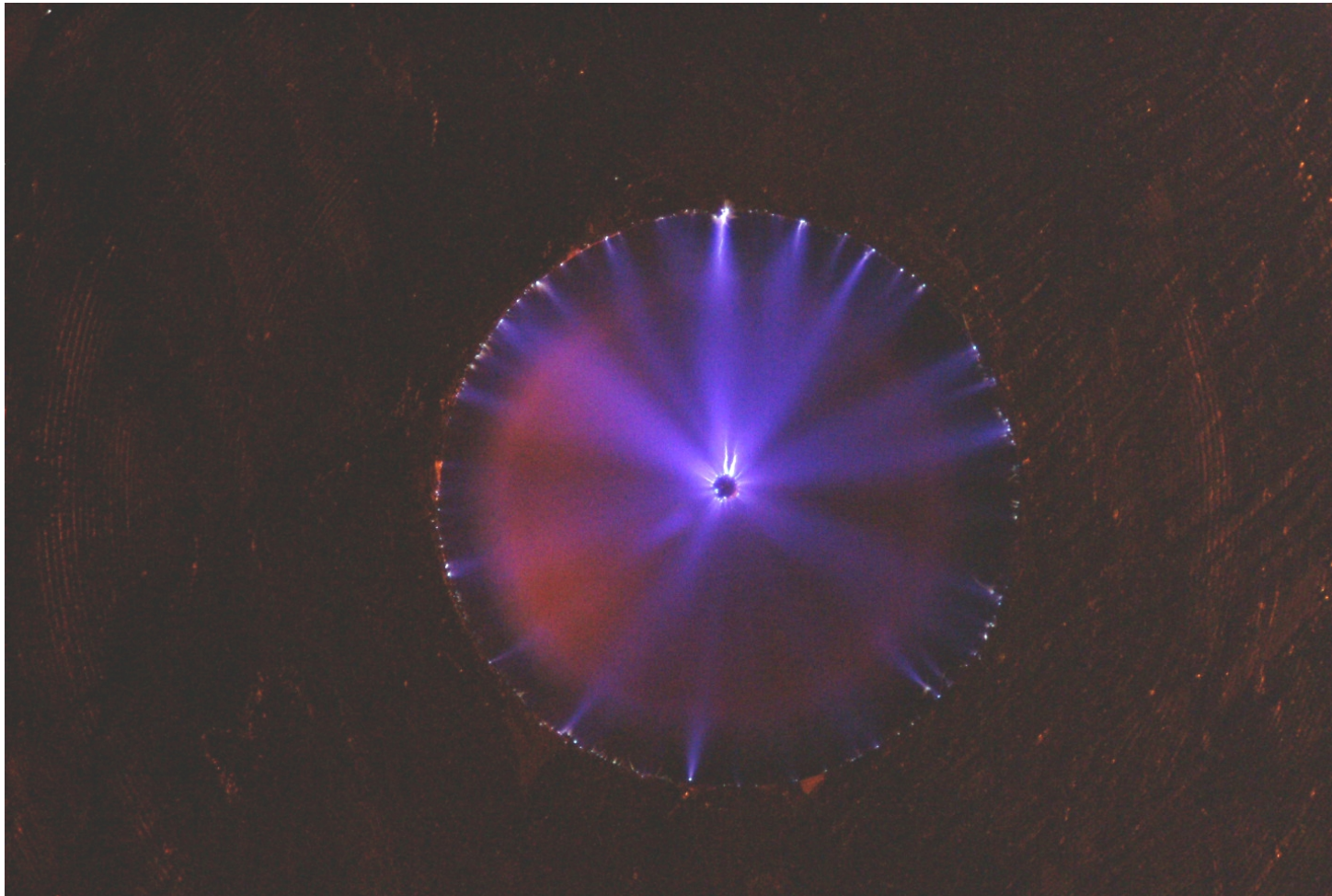


*Evolution of the concentrations of dimethyl sulfide and its main by-products as a function of the specific input energy.*

## Principe de la chambre de combustion en compression

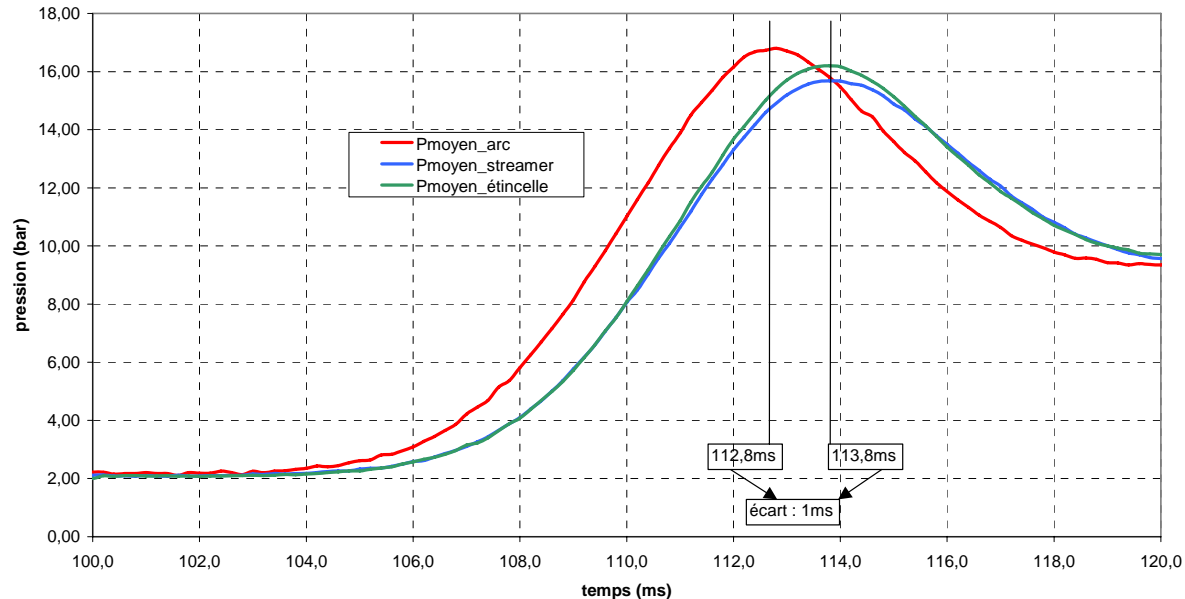


## Visualisation d'une décharge streamer pointe-couronne



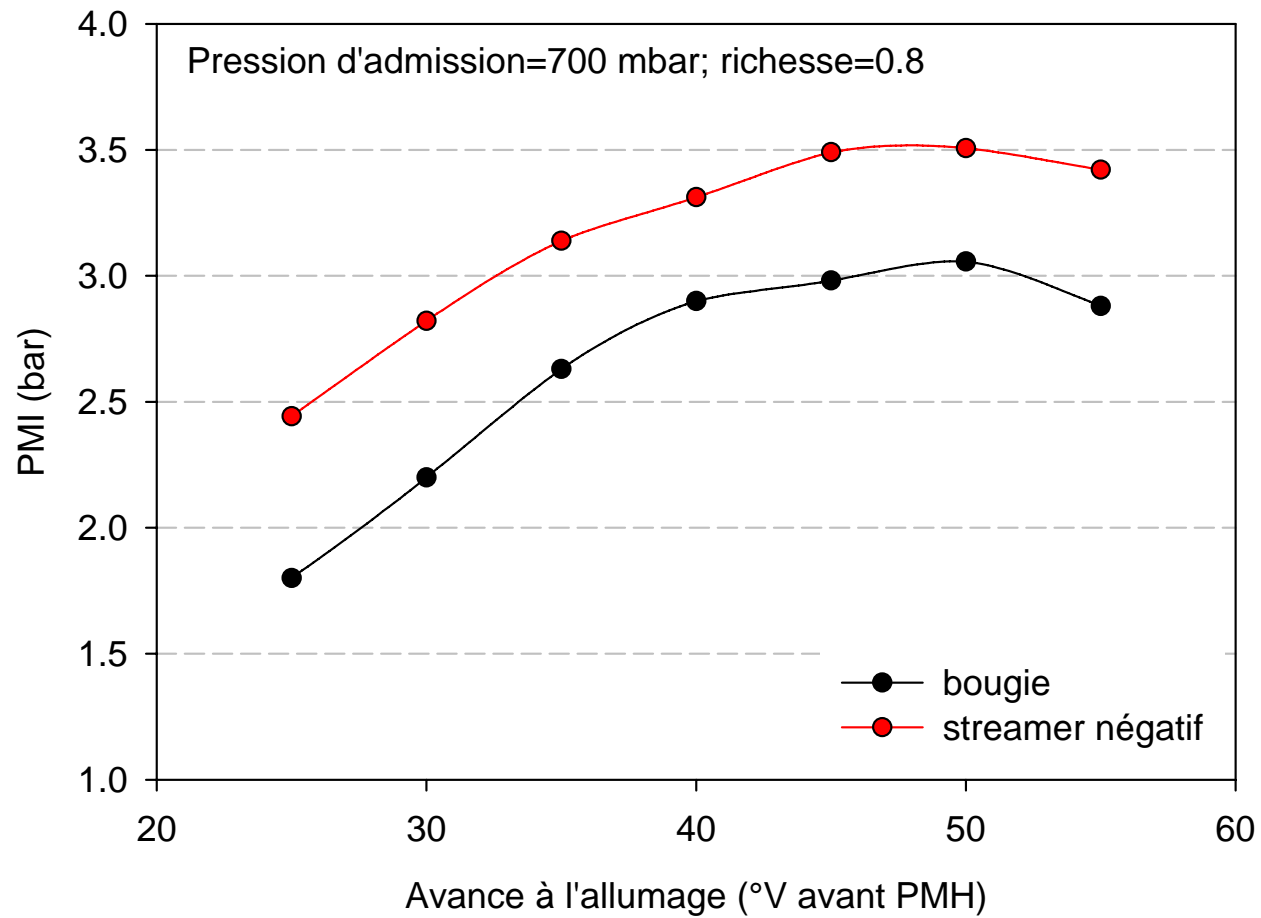
## Allumage d'un mélange combustible

Caractéristiques des pressions moyennes mesurées dans la chambre de combustion dans le cas d'un allumage (allumeur avec couronne de 10mm), campagne essais 092002

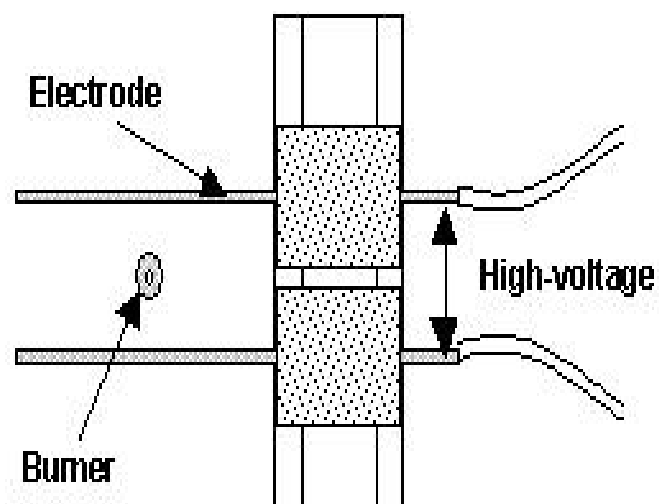
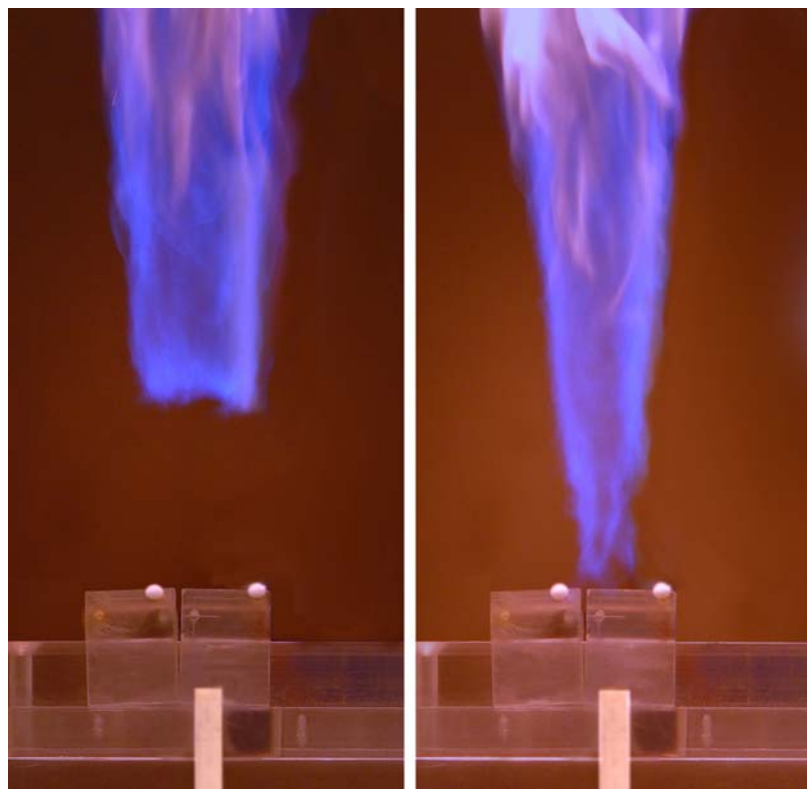


- L'allumage par arc semble plus rapide et plus intense que celui par streamers ou par étincelle
- Gain temporel entre arc et streamers-étincelle : 1ms
- Gain en pression :
  - 0,6 bar par rapport à l'étincelle
  - 1,1 bar par rapport aux streamers

## Allumage d'un mélange combustible



*Evolution de la PMI en fonction de l'avance à l'allumage à richesse 0.8*



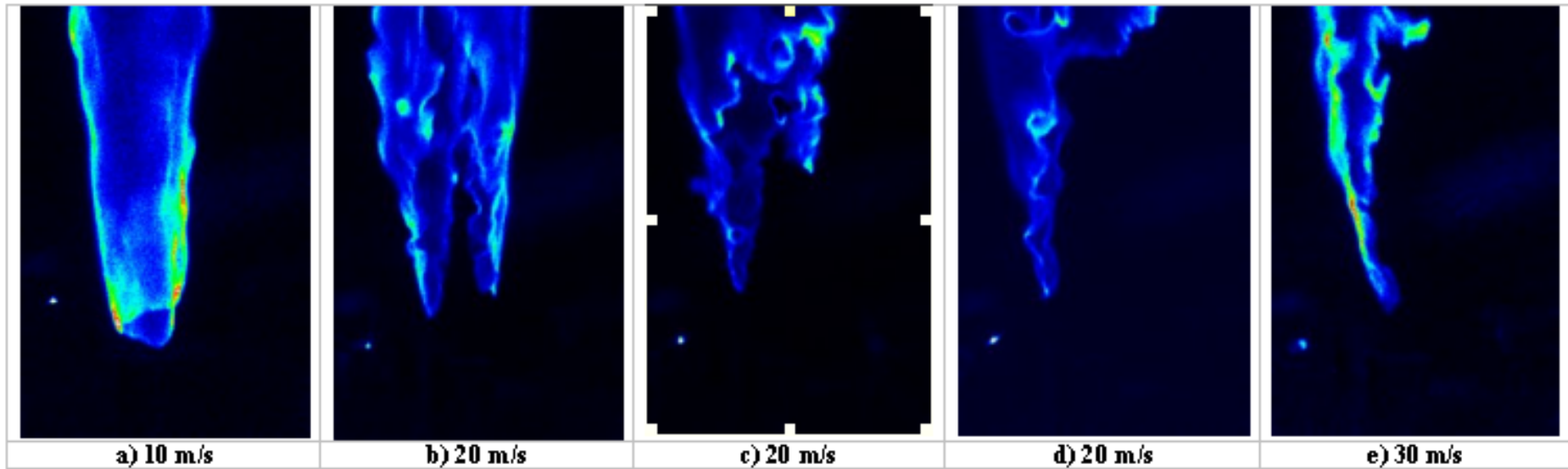
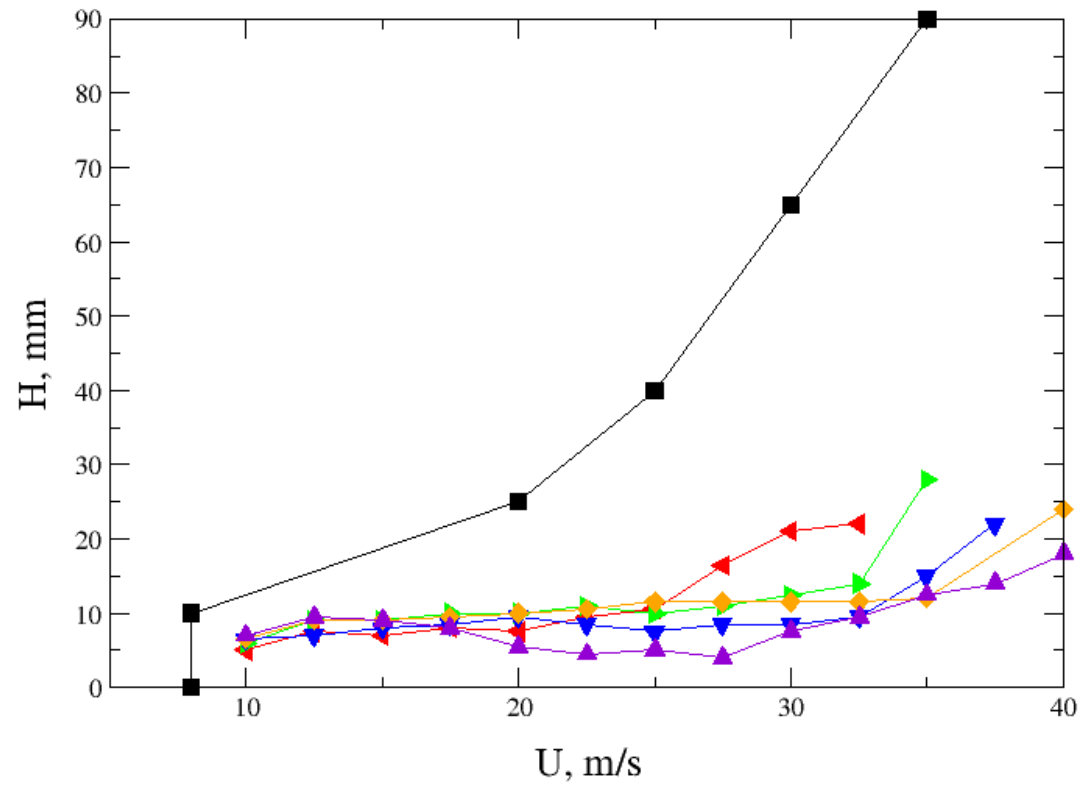


Figure 6. OH images of flames with DCGE at 15 kV.



**Lift-off height versus velocity with DCGE.**  
 ■: natural, ◀: 5kV, ▶: 7.5kV, ▼: 10kV, ▲: 15kV, ◆: 20kV