Ecogas ISE measurement campaign

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EP-DT
Detector Technologies

Outline

- Measurement campaign
  - Chamber
  - Irradiation conditions
  - Measurement methods
  - Chamber HV
  - Measurement workflow
  - TODO list

Organization - chamber

Use CMS-GT to perform measurements:

- Already used in the past
- Reliable performance

Gas settings:

- Only CMS-GT (TOP and BOT) connected to the return line
- ECOGAS 2 mixture first (65% CO_2 + 30% HFO)
- Standard mixture later
- 4°C dew point
- 1 vol/h ~ 3 ln/h fresh gas

Organization - irradiation conditions

ABS

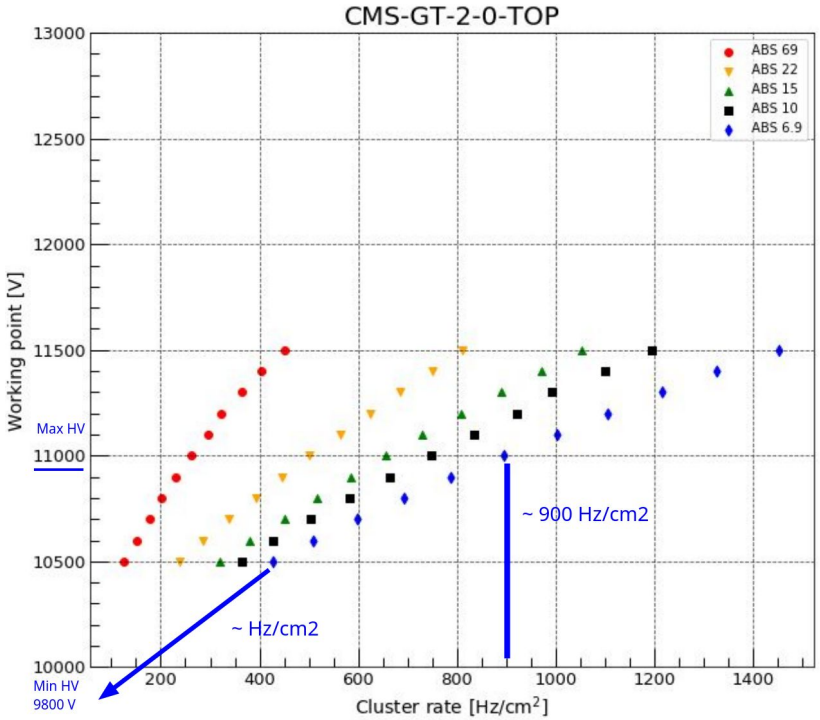
- Use ABS 6.9
  - Used to irradiate chambers
  - Max 900 Hz/cm2
- In alternative: ABS 2.2

Gas mixture	HV	Comments
Standard	(9000 V)	As last point
Standard	9400 V	
Standard	9600 V	
Standard	9800 V	Interesting to compare
ECO2	9800 V	
ECO2	10200 V	
ECO2	10600 V	Operating conditions
ECO2	11000 V	Working point from lab

Irradiation conditions

ABSs

- Use ABS 6.9
  - Range 0-900 Hz/cm2 from Amrutha and Mapse measurements
- In alternative: ABS 2.2
  - Used to irradiate chambers



https://agenda.infn.it/event/26347/contributions/133678/attachments/80215/104693/AmruthaEcogas_meeting_24_03.pdf

Measurement methods

Measurement on the rate of F- concentration

- Return gas bubbling into solution
- Detector ON + source ON
- Continuous ISE measure of 3-4 hours with 30 seconds sampling

The measured value is the stable mean rate of F- accumulation (in ppm/h or umol/h)

Measurement workflow

1. Detector at low voltage (~4 kv) overnight
2. Detector ON at desired HV in the early morning
3. Start measuring concentration in the early afternoon
4. After 3-4 hours stop measure and put the detector to low voltage
5. Repeat for each gas mixture and HV

Time required: 1 working day per HV point (0.5 standby and irradiation + 0.5 irradiation and measurement)

TODO list

TODO (general)

- Define when to start campaign (w15 suggested)
  - Total required time: 8 days (8 afternoons of man power) + material preparation ~ 1 day
- Request source stable conditions to GIF++ users
  - Required conditions: 8 days ABS 6.9 upstream
- Electrodes calibration
- Return line in the bunker modifications

TODO (each day, specific to each measurement)

- Solution preparation
- Cleaning of electrodes + solution containers
- Storage of electrodes