

CHARACTERISATION OF A NEW RPC PROTOTYPE USING CONVENTIONAL GAS MIXTURE

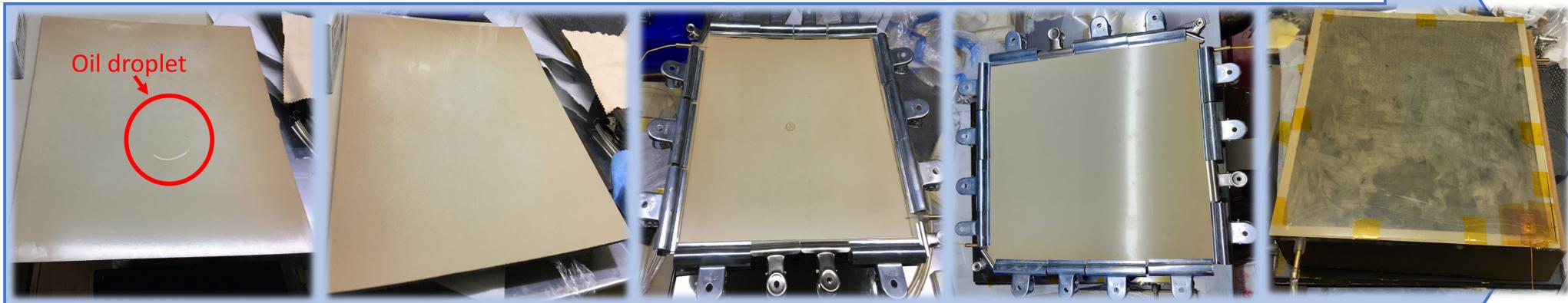


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In high energy physics experiments, Resistive Plate Chambers (RPCs) are being used for triggering and tracking because of their high efficiency, good time resolution and low cost of fabrication. A new technique is introduced to do the linseed oil coating on the bakelite plates for a prototype RPC.

FABRICATION STEPS



Application of linseed oil

Oil coated bakelite surface

Gluing of spacers and nozzles

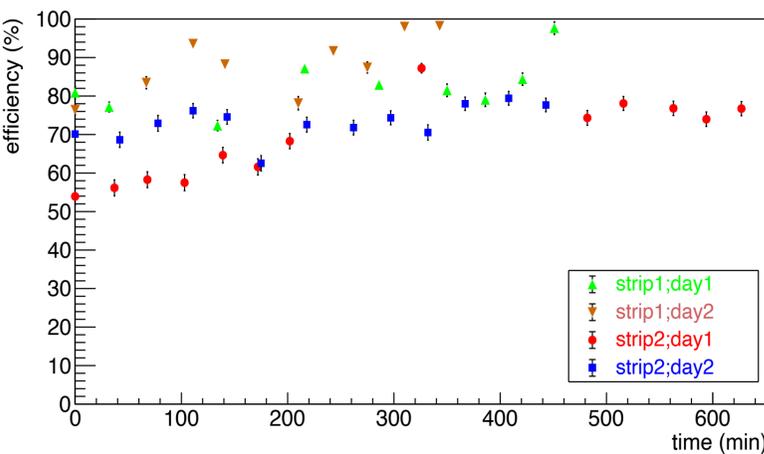
Gluing the second plate

Complete RPC module

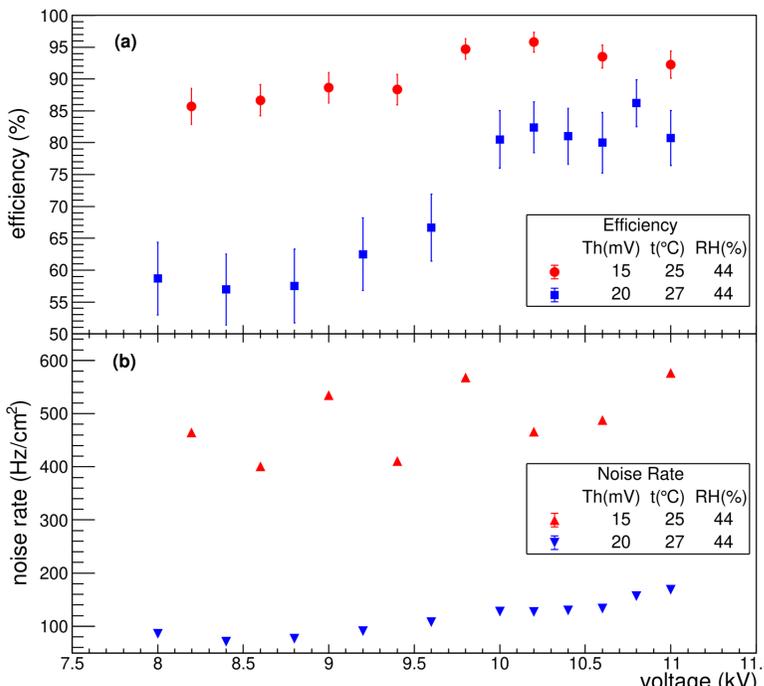
about 2 g of linseed oil is applied over each surface. Based on the specific gravity (0.930 at 15.5°C) of the fluid, the estimated coating thickness would be ~ 30 μm

The linseed oil coating is done before making the gas gap. The advantage of this procedure is that after linseed oil coating it can be checked visually whether the curing is properly done or any uncured droplet of linseed oil is present.

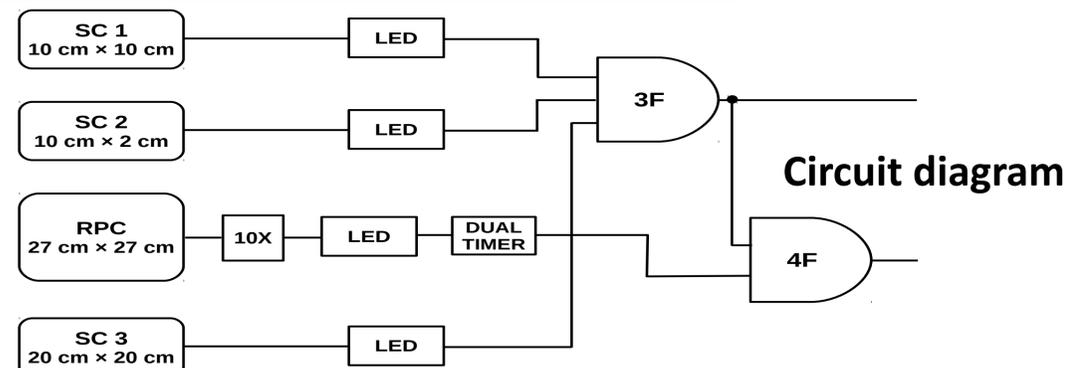
RESULTS



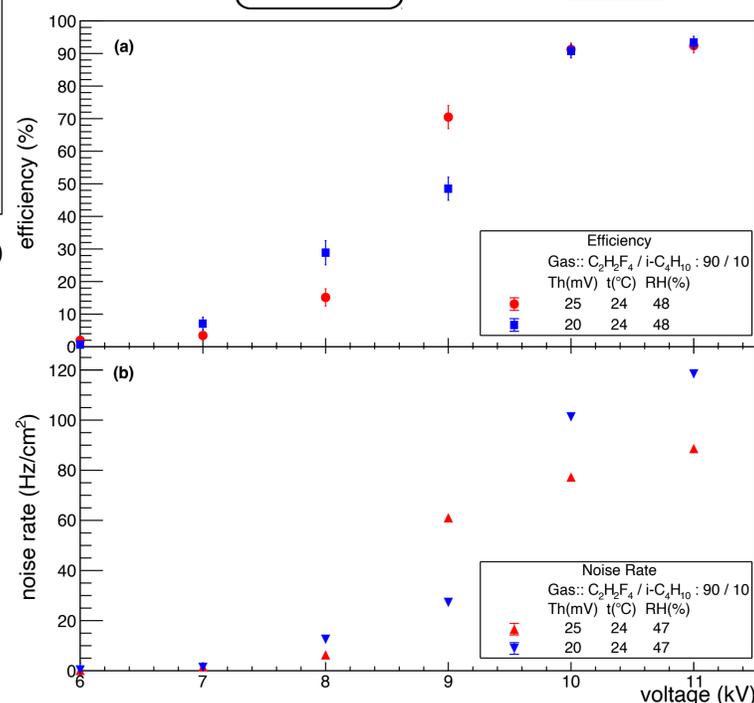
Conditioning of the prototype



The efficiency and noise rate as a function of the voltage for 100% Tetrafluoroethane (C₂H₂F₄)



Circuit diagram



The efficiency and noise rate as a function of the voltage for C₂H₂F₄ / i-C₄H₁₀ : 90/10 volume ratio

- For 100% C₂H₂F₄
 @Threshold: -15 mV
 efficiency ~95%
 noise rate ~500 Hz/cm²
- @Threshold: -20 mV
 efficiency ~85%
 noise rate ~200 Hz/cm²
- For C₂H₂F₄ / i-C₄H₁₀ : 90/10
 @Threshold: -20 mV
 efficiency ~95%
 noise rate ~120 Hz/cm²
- @Threshold: -25 mV
 efficiency ~95%
 noise rate ~90 Hz/cm²

ACKNOWLEDGMENT

Ms. Rudrapriya Das

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