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New method of linseed oil coating for bakelite RPCs for heavy-ion experiments

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Single gap Resistive Plate Chambers (RPCs) are currently used in High Energy Physics (HEP) experiments for triggering (ALICE) and tracking (CBM) purposes for high efficiency ($> 90\%$), good time resolution ($\sim 1-2$ ns) and low-cost of fabrication. Multigap RPCs (MRPCs) are used for Time of Flight (TOF) measurements for their excellent time resolution. MRPCs are also potential candidates for high-resolution medical imaging.

Keeping in mind their high rate handling capability and cost effectiveness, bakelite plates having moderate to low bulk resistivity are being explored for use as large area RPC in future heavy-ion (HI) collision experiments.

In bakelite RPC, the electrode plates are coated with linseed oil to get rid of the surface roughness of the electrodes, reduce the UV sensitivity and to save the electrode surface from hydrofluoric acid (HF) vapor attack. In conventional bakelite RPC, the linseed oil coating is done after making the gas gap keeping no scope for visual inspection for presence of any uncured linseed oil droplet. In this work, a new technique is introduced to coat the linseed oil in bakelite RPC before making the gas gap. After the linseed oil coating, the plates are cured for several days and then the gas gap is made. 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 in the gas gap.

Standard NIM electronics is used to test the prototype. When operated with 100% Tetrafluoroethane ($C_2H_2F_4$) gas in the avalanche mode an efficiency $\sim 90\%$ is achieved using cosmic rays.

Authors: SEN, arindam; CHATTERJEE, Sayak; DAS, Supriya (Bose Institute (IN)); GHOSH, Sanjay (Bose Institute); BISWAS, Saikat (Bose Institute (IN))

Presenter: SEN, arindam

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