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Study of outgassing in the resistive plate chamber detectors for the INO-ICAL experiment.

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Resistive Plate Chambers are the gaseous detectors and uses gas as their active medium for the detection of charge particles. Glass based resistive plate chambers of size 2m X 2m, operated in avalanche mode will be used as an active detector element at INO-ICAL experiment. In order to fulfill the physics goal, about 29,000 RPCs will be used for 20 long years. The quality and purity of the gas play vital role in the stable operation of RPC detectors. The presence of impurities in a gas mixture contribute toward the degradation of detector performance. The various materials like glues, buttons spacers, frames, etc. used in the construction of the chamber may cause outgassing and contaminate the input gas mixture as a result. We have performed the very first study to estimate the outgassing due to various materials used in the construction of INO RPCs. The present study includes the results obtained from gas chromatography showing the generation of impurities and dangerous radicals produced due to outgassing when RPC was operated in the cosmic stand.

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