



Contribution ID: 261 Contribution code: S05-HEP-110

Type: Oral presentation

Physicochemical study of electrode aging in CSC longevity tests using eco-friendly gas mixture Ar/CO₂/HFO1234ze

Tuesday, 30 August 2022 15:05 (15 minutes)

Finding eco-friendly replacement for CF₄ while preserving performance and long-term operation of gas discharge detectors is of the high environmental and economic importance. Tetrafluoropropene (C₃H₂F₄) with the trade name HFO1234ze appeared as promising candidate with low GWP. Using gas mixture of 40% Ar, 58% CO₂ and 2% HFO1234ze, longevity tests were performed with β -source ⁹⁰Sr and accumulated charge 1.2 C cm⁻¹. Deterioration of the electrode surfaces was studied using scanning electron and atomic force microscopy techniques. Structural and elemental chemical analysis of deposit formed on the electrodes was analyzed using X-ray diffraction, vibrational and energy dispersive spectroscopy.

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Session Classification: S05 High Energy Physics (Particles and Fields)

Track Classification: Scientific Sections: S05 High Energy Physics (Particles and Fields)