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3P43 - Temperature effect on the surface flashover plasma of the GIS insulator

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Flashover plasma across an epoxy sulfur hexafluoride interface in gas insulated switchgear (GIS) may induce blockage of power cut. However, characteristics of flashover plasma across an epoxy sulfur hexafluoride interface under the operation temperature of GIS (80 Celsius degree) were less discussed previously. In this work, a high voltage experiment setup was built to investigate the temperature effect on the surface flashover plasma. The voltage, current, acoustic and ultra-high frequency signals were obtained with different kind of sensors. The experiments indicate that the flashover voltage reduced 11.74% when temperature increased from 20 Celsius degree to 80 Celsius degree. The distributions of electric field, temperature and the gas density were also simulated. A particle-in-cell model including field electron emission and temperature was developed to discuss the temperature effect. From the simulation results, it can be concluded that at higher temperature, it has more tendency to develop flashover across an epoxy sulfur hexafluoride interface initiated by field electron emission. This work will give a reference for evaluation and design of epoxy sulfur hexafluoride interface for high-voltage GIS applications.

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