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Influence of Metallic Particle on Flashover Characteristics of Post Insulator in SF₆ Under Negative DC Voltage

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The flashover of insulators is a bottleneck for the development of gas insulated transmission line (GIL). The operation experience of GIL shows that metallic particle plays an important role in flashover of the insulator. An experiment platform was established to study the influence of gas pressure on the flashover characteristics of the post insulator in SF₆ under negative DC voltage. The impacts that the position and size of a metallic particle had on flashover characteristics were also studied. The distribution of electric field was processed by the finite element analysis software. The results indicate that the flashover voltage reaches the maximum value with the increase of gas pressure. This phenomenon is connected with the distribution of space charge. The flashover voltage drops rapidly when the metallic particle is attached to its high voltage electrode. The reduction of flashover voltage will become slow when the metallic particle's length extends a certain value. The metallic particle will cause the greatest threat to insulation level when it is attached to the electrode of post insulator. The flashover voltage increases at first and then decreases when the distance between the metallic particle and high voltage electrode increases. The process of flashover was analyzed in the aspect of distribution of electric field.

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