Various Effects of Particle Movement in a Single Phase Uncoated Encapsulated GIS with Various Gas Mixtures

Abstract

SF6 gas compressed in metal encapsulation has lessened the size of transmission and distributed substation as well as reliability is enhanced considerably over conventional substations. Metal encapsulated gas insulated substation (GIS). Basically consists of enclosure, insulators to support conductor which is crammed with SF6 gas. Since SF6 is a green house gas leads to global warming, one alternate arrangement to SF6 is to use gas mixture. This gas mixture gives matching chemical and physical properties as SF6. In a GIS the withstand capability of voltage level depends on field perturbations which occurs due to imperfections on the surface and by contaminated particles which are conducting. The conducting particles lifts up and migrate to various portions in between inner conductor and outer enclosure which leads to breakdown at voltage levels below SF6 gas insulation characteristics. In this paper, using the equation of particle motion in an electric field, simulation of particle movement is carried out for various gas mixtures such as SF6/Air, SF6/Ar, SF6/Kr, SF6/CO2 and SF6/N2 of various proportions. Cu and Al are considered as metallic particles for the study to examined and presented.
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Index Terms

Computer Science
Applied Sciences

Keywords
Encapsulated GIS  global warming  particle contamination  gas mixtures  particle movement.
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