Characteristics of Surface Flashover on Immersed of Solid Spacer in LN_2

Youngseok Kim, Byeongsung Lee, Seongmyeong Baek, Sanghyun Kim
Dept. of Electrical Engineering, Gyeongsang National University Gazwa-dong 900, chinju, Korea
Tel : +82-591-751-5345, Fax : +82-591-759-2723
E-mail : shkim@nongae.gsnu.ac.kr

1. Introduction

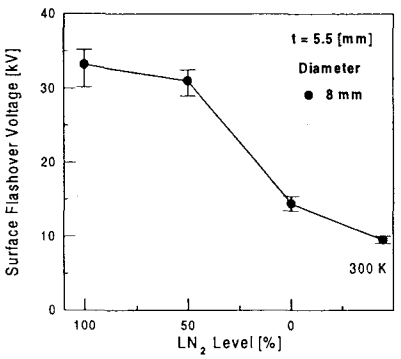
Composite insulation system of liquid nitrogen and solid spacer is widely applied in high temperature superconducting power machine. We've investigated the effect of spacer thickness and the direction of immersed electrode in liquid nitrogen(LN_2). The effect of spacer thickness affected surface flashover voltage.

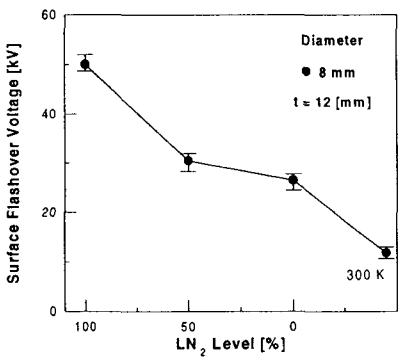
2. Experiment

Stainless steel (SUS 304) used for electrode and electrode configuration for measurement was sphere-to-plane electrode. Solid spacers were glass fiber reinforced plastic(GFRP). The diameters of inner spacers were controlled at 2.5,6,8,10[mm], and the two kinds of configuration of electrode system were used . To investigate surface flashover voltage along the direction of immersed electrode in LN_2 , we adopt the electrode system by vertical immersion and parallel immersion.

3. Results and Discussion.

In two kinds of spacer thickness at 5.5, 12 [mm], the space flashover voltages with level of LN_2 were different. The space flashover voltage was strongly decreased at 12 [mm] in half of LN_2 (Fig. 2.), but 5.5[mm] was almost the same as that in fully immersed. (Fig. 1.)
In case of thin spacer, flashover voltages were so high, because LN_2 climbed the upper electrode, as higher electric field. But the surface flashover of thick spacer half immersed occur in cryogenic gaseous nitrogen having low insulating endurance.





4. Reference

1. A.Bulinski and J.Densley, IEEE Trans. on Electrical Insulation, **15**, 89-96, 1980.