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A Study on the V-t Characteristics of PPLP according to Electric Field Uniformity for a Superconducting Transformer

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The application of high voltage superconducting apparatuses is considered as one of the most promising countermeasures against the increased power consumption. In order to ensure the electrical safety of high voltage superconducting apparatuses such as superconducting transformers and superconducting cables, the electrical insulation design should be conducted considering aging characteristics. In this study, V-t characteristics of polypropylene laminated paper (PPLP) known as the most proper solid insulation material for a high voltage superconducting transformer. V-t characteristics of PPLP according to its electric field uniformity are experimented analyzed to ensure the reliability of long-term operation. Dielectric experiments are conducted in saturated liquid nitrogen of 77 K in temperature. Dielectric experiments on V-t characteristics of PPLP are performed with four kinds of sphere-plane electrode systems according to various pressures. It is found that aging characteristics of PPLP are dependent on the electric field uniformity as well as pressure.

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