

高电压技术

天然酯与矿物油纸绝缘的加速热老化特性研究

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摘要: 用天然酯和矿物油分别与普通变压器纸组成试品, 在3个不同温度下分别进行加速热老化试验, 研究天然酯-纸绝缘和矿物油-纸绝缘老化特征参量的时效老化规律异同。结果表明: 天然酯能有效抑制绝缘纸老化; 在各老化温度下, 天然酯中酸值随时间变化曲线的拐点所对应的时间与酯中水分含量达到老化过程中最高点的时间相同; 天然酯-纸绝缘中, 糠醛含量依然可以作为反映绝缘纸老化的重要特征量, 糠醛浓度对数值和绝缘纸聚合度之间也存在较好线性关系; 天然酯中CO和CO2含量比矿物油中的要低, 但CH4、C2H4、C2H6及总烃含量都比矿物油中的要高。

关键词: 天然酯 矿物油 油纸绝缘 热老化 纤维素

Study on the Accelerated Thermal Aging of Nature Ester-paper Insulation and Mineral Oil-paper Insulation

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Abstract: The accelerated thermal experiments were performed at three different temperatures, using the samples which were composed of mineral oil or nature ester with the Kraft paper, and the aging disciplinarians of the oil-paper insulation and the ester-paper insulation were analyzed. Meanwhile, the homology and the dissimilitude between them were researched. The results show that the nature ester can restrain the degradation of the paper. The contest in the ester is the highest when the acid increase speed is increasing abruptly. There is linearity relation between the degree of polymerization (DP) and the log value of furfural content for nature ester-paper insulation, the furfural content can be used to evaluate the aging state of the paper in the ester-paper insulation as well. The content of CO and CO2 in the nature is less than the ones in the mineral oil. In contrast, the content of CH4, C2H4, C2H6 and overall hydrocarbon in the nature ester are more than the ones in the mineral oil.

Keywords: natural ester mineral oil oil-paper insulation thermal aging cellulose

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