

**C10.12****Mie Scattering characteristics of defects in cross-linked polyethylene insulation of power cables**

ZHAO H., TU D., Xian Jiaotong University, Xi'an, China

LU Y., LIU L., Harbin University of Science &amp; Technology, Harbin, China

The impurities and microvoids distort seriously the electrical field in insulation to cause the electrical treeing breakdown of XLPE cable insulation. So to minimize their dimension and density is the key point for developing the HV and EHV XLPE cables. The developed countries have worked out some relative standards for checking the producing quality of insulation in HV and EHV XLPE cables.

Examining the cut section of insulation through the microscope is the traditional method of detecting impurities and microvoids. However the examining range of insulation is small and the speed of examination is low.

In order to realize the whole examination of a part of cable insulation and increase the speed of examination, to develop a laser scanning automatic record and statistical instrument is demanded. As a theoretical basis, the light absorption and scattering characteristics is firstly studied.

Mie scattering theory is used to analyze the angular characteristics of defects in this paper. It has been found that there is the distinct difference of scattering intensity among the black particles, microvoids and semi-transparent particles in polyethylene insulation, in the ranges 8 –20 and 60 –80 angular windows. This deduction has been proved experimentally and it provides a sound basis for developing the laser scanning detection instrument, which can be used to detect and discriminate the dimension and type of the defects in XLPE insulation of HV and EHV cables