An experimental study on surface discharge characteristics of different types of polymeric materials under AC voltage

ABSTRACT

Surface discharge is a common electrical discharge that normally occurs on the surface of outdoor insulators and also causes the failure in the electrical insulation system. One of the causes of surface discharge is the presence of high voltage stress. Experimental works had been carried out to examine the surface discharge characteristics on polymeric samples as insulation material. The IEC (b) electrode configuration had been used to investigate the surface discharges phenomena of different types of polymeric materials with controlled of air relative humidity (RH). In these experimental works, three types of polymeric sample were selected, namely high-density polyethylene (HDPE), ethylene-vinyl acetate (EVA), and polystyrene (PS), respectively. The characteristics of the discharge are critically depending on the types of polymer. Surface discharges intensity, number of discharge occurrence, and surface morphology of each polymeric material were also investigated. Comparisons of these electrical characteristics were conducted among the samples. Results from the experiment showed that the EVA samples experienced severe degradation as compared to HDPE and PS samples.