

ABSTRACT

In the recent years natural rubber has been completely replaced by synthetic rubbers and plastics as cable insulation. The physical properties required for wire and cable insulation depend on the type of application. It should have good elongation and tensile strength and toughness, so that it will withstand handling during installation and service. It should also have low dielectric constant and power factor but high dielectric strength and insulation resistance. Also, during operation, because of overloading, the insulation may be exposed to high temperatures for long periods. This necessitates the insulation to have excellent resistance to ageing at high temperatures [1]. The main types of insulation used in the cable industries are paper, rubber, plastics and compressed gas. Paper insulated lead sheathed cables are still used because of their reliability, high dielectric strength, low dielectric loss, and long life [2]. The most commonly used insulating materials for low and medium voltage (up to 3.3 kV) cables are polyvinyl chloride (PVC). PVC is not suitable for high voltage applications because of its high dielectric constant and high loss. The polyvinyl chloride (PVC) has played an important role in electrical insulation in electrical components and equipment. Sometimes, in the manufacture of PVC cables jacketing, the additives for the formation and their compatibility may affect on the electrical properties of the cable. Therefore, the response of dielectric properties of PVC to imposed alternating electric field (AC) of various strengths and frequencies become point of interest [3]. The additives used in PVC formulations are mainly plasticizers, stabilizers, lubricants and fillers. Fillers have important roles in modifying the properties of various polymers and lowering the cost of their composites. The effect of fillers on properties of composites depends on their level of loading, shape and particle size, aggregate size, surface characteristics and degree of dispersion [4]. UEKI showed that the filler dispersion is one of the factors that have an influence in the electrical strength on composite [5]. Low electrical strength could lead to failure of cable due to overvoltages