The importance of dielectric liquids (mineral and/or vegetable oils) in the electrical industry is crucial, since any improvement in the properties of breakdown voltage and heat transfer implies significant changes in the dimensioning of the power equipment; for example in power transformers. This translates into a decrease in the cost of generation-transmission of electrical energy.

Since the mid of 90s of the last century it was discovered, that the performance of liquid dielectrics added with nanoparticles of different nature (conductive, semiconducting and insulating) improves the values of breakdown voltage and heat transfer. Values on these parameters have been reported and exceed almost twice from those commonly found in pure oils. It is known from these studies that the best rupture conditions, for different mixtures of oils and nanoparticles, are found in particle concentrations of less than 1% by volume and sizes of the order of 10 to 20 nm. However, there is still a lack of information in order to be able to use dielectric nanofluids in present electrical industry. On the other hand, on the process and mechanisms of pre-rupture: partial discharges, sliding discharge, streamer, etc., little have been studied. Since most of the scientific literature only values the performance are reported under dielectric breakdown conditions and for different voltage conditions (C.A., C.D. and Impulse).

The present work summarizes the current knowledge of properties of rupture and other parameters, which defines the performance of a dielectric nanofluid. We also present advances on pre-rupture mechanisms of nanodielectrics liquids, of which there is not enough information at present day.

Keywords: dielectric nanofluids, liquid dielectric, pre-rupture phenomena

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