Summary

I-SUMMARY

Grease/defined as any oil mixed with either organic or inorganic fillers. Modern greases contain one or more fillers, base oil, additives and an optional tackifire which makes the grease sticky and increases adherence.

Greases used in insulators service are classified on the basis of the formulations into three types: hydrocarbon, polymer and inorganic types.

This thesis is divided into three chapters. The first chapter concerned with the introduction, the second concerned with the experimental and the third chapter concerned with the results and discussion.

The first chapter shows general survey about greases and their compositions (types of base oil, types of thickeners and additives). Classification of greases according to their applications. Definitions of greases characteristics are shown in this chapter. Brief view of advantageous, disadvantageous and applications of greases are show.

The second chapter deals with general information about our chemicals, procedures including preparation of:

1-Wax gel grease: (Transformer oil, base lubes oil, microcrystalline wax, antioxidant and anticorrosion).

2-Copolymers esters: Poly (1-octadecene–co-maleic anhydride) bis behanate ester, poly (1-octadecene–co- maleic anhydride) bis stearate ester and ethylene glycol bis stearate ester.

3-Greases: by adding quantities of polyethylene, atactic polypropylene, polyvinyl chloride, plasticized Polyvinyl chloride, atactic polypropylene including [poly(1-octadecene–co-maleic anhydride) bis behanate ester,

poly(1-octadecene–co-maleic anhydride) bis stearate ester and ethylene glycol bis stearate ester, butyl rubber, polyisoprene, bitumen, ultramarine, silica from rice husk, nano- kaolin, nano talc or sodium silicate to the prepared wax gel.

Different methods for characterization of the prepared greases were used such as dielectrical properties, dynamic viscosity, flash point, dropping point and penetration.

The third chapter deals with results and discussion of our work, the physico-chemical properties of base oil blend (its good characteristics over base lube oil and transformer oil) and microcrystalline wax were discussed. Base oil blend, base lube oil grade 260/290, transformer oil, microcrystalline wax, silica from rice husk, the prepared copolymers and ester were characterized by using FTIR spectroscopy.

Comparison between the different ratios of the prepared wax gel grease, show that the best ratio is 2.3:1 of base oil blend to microcrystalline wax respectively.

Physico-chemical properties of the prepared greases were studied. It was found that atactic polypropylene has the best characteristics than the other samples so it is used in a mixture with the prepared copolymer in the formulation of some greases.

The comparative study is made between the chemical structure and the electrical properties of the prepared greases and found that all samples have good dielectric properties (low dielectrical constant and dielectrical loss - high volume resistivity) and the better was found to be:

1- Grease containing atactic polypropylene has good dielectric properties than that containing, polyethylene, polyvinyl chloride and plasticized polyvinyl chloride.

2- Grease containing poly (1-octadecene–co-maleic anhydride) bis behanate ester has good dielectric properties than that containing poly (1-octadecene–co-maleic anhydride) bis stearate ester and ethylene glycol bis stearate ester.

3- Grease containing butyl rubber has good dielectric properties than that containing polyisoprene rubber and bitumen.

4- Grease containing nano talc and silica from rice husk have good dielectric properties than that containing ultramarine, nano- kaolin and sodium silicate.