Synthesis and Study of Some Prepared Polyester Nanocomposites

A Thesis

Submitted for

Ph.D. Degree of Science

In

Organic Chemistry

To

Chemistry Department

Faculty of Women for Art, Science and

Education, Ain Shams University

By

Salwa Mostafa Kamel Ahmed El-mesallamy

M.Sc. in Organic Chemistry

Faculty of Science, Tanta University

2016

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(Submitted for Ph. Degree in Organic Chemistry)

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To My Father Soul

Diagram

Acknowledgment

Acknowledgment

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I wish to express my thanks and respect to ***Dr., Nahla AhmedMansour,*** Assistance professor of chemistry, Petrochemical Department, Egyptian petroleum research institute (EPRI), who give me the help, guidance and encouragement.

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Aim of the Work

Synthesis and Study of Some Prepared Polyester Nanocomposites

Unsaturated polyester (UP) resin of the most polymeric materials using in the present time in a wide range of automotive and aerospace applications, and for shipbuilding or electronic devices because of the low cost, characterization of high performance and operating at a fast rate. However, because the polymer matrix must withstand high mechanical and tribological loads, it is usually reinforced with nanofillers. These nanofillers can be chosen as sheets (e.g. exfoliated clay stacks), carbon nanotubes or spherical particle (e.g. carbon nanoparticles).

This work aims to prepareunsaturated polyester (UP)composed of dimethylTerephthalate, ethylene glycol and malice anhydride. The prepared unsaturated polyester willmodify by excess of ethylene glycol. The two matrices of unsaturated polyester and modified unsaturated polyester will evaluate by FTIR, GPC, thermal gravimetric analysis and mechanical properties such as nanoindentation and microhardness.

some polymeric composites with weight % (3,5,7,10,20,30,40,50 and 60) will prepare of both Egyptian bentonite (EB) and carbon black (CB) with two the matrices.

thenanocomposites based on unsaturated polyester and modifiedas matrices with nano material fillers such as organo clay (OB)wt % (3,5,7 and 10) carbon nanoparticles (CNP), and multiwall carbon nanotube (MWCNT)wt % (0.01, 0.02, 0.03, 0.04 and 0.05%) as reinforcement materials will prepare. Study the effect of concentration of micro and nano reinforcement materials on properties ofthe prepared unsaturated polyester composites and nanocomposites.

Comparative study between the properties of the prepared unsaturated polyester nanocomposites and the unsaturated polyester composites based on the same traditional type of fillers (e.g clay and carbon black).

Study the physical properties of the best prepared polymeric composite samples, such as electrical, thermal, and mechanical properties as soon as chemical resistance. Study the morphology structure of some chosen prepared composites samples by Electron Microscope.Evaluation of prepared unsaturated polyester nanocomposites according to Egyptian and universal standards specifications.