Synthesis and characterization of superconductive and anticorrosive polymer nanostructure via gamma irradiation and its possible applications in thermal plants

A Thesis Submitted to Chemistry Department
Faculty of Science - Ain Shams University

In fulfillment of the requirements of the Ph.D. in Chemistry (Ph.D.)

By

Mohamed Salah Abd EL- Rasoul Soliman
M.Sc. Fac. of Science
Ain Shams University, 2012.

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APPROVAL SHEET

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Aim of work

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In recent years, developments of inorganic–organic hybrid materials on nanometer scale have been received a significant attention due to a wide range of potential applications, high absorption in the visible part of the spectrum and high mobility of the charge carriers. Polymers such as polyaniline (PANI) is the most attractive conductive polymer because of the presence of the reactive– NH– groups in polymer chain ***[Ameen et al., 2009]***.

These polymers can be used in broad applications such as batteries, sensors, electronic devices, super capacitors and corrosion protection in organic coatings, due to its physical and chemical properties as a good electrically conductive, high environmental stability, low cost, light weight, flexibility, and facile fabrication.

In this study, polymers such as polyaniline, epoxy,…etc. and its nanocomposites with titanium dioxide (TiO_2) and silver oxide nanoparticles will be fabricated by gamma irradiation at different doses and different compositions. The products will be characterized by FTIR spectra, X- ray diffraction (XRD), scanning electron microscope (SEM) and transmission electron microscope (TEM). The thermo gravimetric analysis (TGA), electrical conductivity, and chemical resistance will be