

***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
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APPROVAL SHEET

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By

Mohamed Salah Abd EL-Rasoul Soliman

B.Sc. Fac. of Science, Assuit University , 2005.

**This Thesis for Ph.D. Degree in chemistry has been
approved by:**

Name:

Signature:

1- Prof. Dr. El-Sayed Ahmed Soliman Abd El-Aziz

2- Prof. Dr. El-Sayed Ahmed Abd El-Aziz Hegazy

3- Prof. Dr. Hossam Ahmed Shawky

4- Prof. Dr. Mohamed Abd El-Geleel Mohamed

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***Presented by
Mohamed Salah Abd EL-Rasoul Soliman***

Under The Supervision of

Prof. Dr. El-Sayed Ahmed Soliman Abd El-Aziz

*Prof. of organic chemistry., Faculty of
Science, Ain Shams University*

Prof. Dr. El-Sayed Ahmed Abd El-Aziz Hegazy

*Prof. of Radiation Chemistry, National Center
for Radiation Research and Technology (NCRRT)*

Prof. Dr. Magda Borhan El-Din Fahmy El-Arnaouty

*Prof. of Radiation Chemistry, National Center
for Radiation Research and Technology (NCRRT)*

Prof. Dr. Mona Eid Mohamed Mohamed

*Prof. of Radiation Chemistry, National Center for Radiation Research and
Technology (NCRRT)*

Head of Chemistry Department

Prof. Dr. Ibrahim H. A. Badr

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*Prof. of Radiation Chemistry, National Center
for Radiation Research and Technology (NCRRT)*

Prof. Dr. Mona Eid Mohamed Mohamed

*Prof. of Radiation Chemistry, National Center for Radiation
Research and Technology (NCRRT)*

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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 (TiO₂) 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