

**WASTE WATER TREATMENT BY SOME PREPARED
POLYMERS BY RADIATION**

By

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B.Sc. Faculty of Sci. (Chemistry), Ain Shams University, 1982
Master in Environmental Sci., Ain shams university, 2002

**A Thesis Submitted in Partial Fulfillment
of
The Requirement for the Doctor of Philosophy
In
Environmental Science**

Department of Basic Science
Institute of Environmental Studies & Research
Ain Shams University

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APPROVAL SHEET

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Abstract

Synthesis of hydrophilic polymeric material having certain function groups with the ability to absorb some heavy metals and some dyes from waste water is of a great importance from the point of view of environmental studies. The present work may be represented as the following :

The two different methods have been used for the modification of PE-co-PP non woven fabric via two different techniques:-

1. Coating of (PE-co-PP) with mixture of CMC and AAc by using (E.B) irradiation.
2. The modification of (PE-co-PP) non-woven fabric by γ – irradiation induced grafting of (AAm) monomer .
3. The modification of hydrophilic substrate to hydrogel was carried out through the following: The preparation of clay/PVA hydrogel through freezing and thawing followed by E.B. irradiation. The different factors which affect the properties of the modified substrate were investigated. Moreover, the structure properties of the modified substrate were characterized by SEM, XRD, and IR. Thermal properties was also investigated by TGA and DSC. Hydrophilic property of the modified substrate was investigated by water uptake %.

The results obtained show that the prepared substrates can be used in the removal of heavy metals and dyes from waste water.



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List of Abbreviations

PE-co-PP	Polyethylene coated polypropylene non-woven fabric.
CMC	Carboxymethyl cellulose
AAM	Acrylamide
PVA	Poly (vinyl alcohol)
MMNT	Montmorillonite
AAc	Acrylic acid monomer
γ -rays	The gamma radiation source Cobalt 60
E.B.	Electron beam accelerator.
kGy/s	Kilo Gray /second.
VAc	vinyl acetate
AN	acrylonitrile
LDPE	low-density polyethylene
AMPS	2-acrylamido-2-methyl propane sulfonic acid
DMF	dimethylformamide
PFA	poly (tetrafluoroethylene –perfluorovinylether)
CPFs	complex polymeric flocculants
5(BR-5)	basic red
3(BV-3)	basic violet
BCB	brilliant cresyl blue
IA	itaconic acid
(MW)	molecular weight
UV-VIS	Ultraviolet Spectrophotometer
XRD	X-ray Diffraction
CIE	Commission International de l'Eclairage Units
EDX	Energy dispersed X-ray
TGA	Thermogravimetric analysis
DSC	Differential scanning calorimetry
SEM	Scanning electron microscopy
DE*	Colour difference intensity
T_{max}	Temperatures of the maximum value of the rate of reaction
T_m	Temperature of the crystalline melting
T_g	Glass transition temperature
IR	Infra red Spectroscopic analysis.

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