

*Ain Shams University*  
*Faculty of Science*

**SYNTHESIS OF HYBRID ORGANIC – INORGANIC  
MATERIALS FOR POLLUTED GROUNDWATER  
TREATMENT SAN EL HAGER EAST DELTA EGYPT**

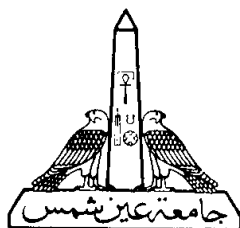
Thesis submitted by

**FATMA MOHAMED EL-SAYED**  
(B.Sc. Chemistry & physics, 2007)

For the Partial Fulfillment of the Requirements  
of the Master's Degree in Science  
(Inorganic Chemistry)

To  
DEPARTMENT OF CHEMISTRY  
FACULTY OF SCIENCE  
AIN-SHAMS UNIVERSITY

**2018**



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**2018**



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## Abbreviations

Abbreviations	Meaning
<b>BOD</b>	biochemical Oxygen Demand
<b>CuO</b>	Copper Oxide
<b>CB</b>	Conduction Band
<b>COD</b>	Chemical Oxygen Demand
<b>CAI</b>	Chloro-alkaline indices
<b>DRC</b>	Desert Research Center
<b>DO</b>	Dissolved Oxygen
<b>EC</b>	Electrical Conductivity.
<b>ES</b>	Effective salinity
<b>E<sub>bg</sub></b>	Energy band gap
<b>ΔE<sub>g</sub></b>	Energy interval
<b>e<sup>-</sup></b>	Electron
<b>FTIR</b>	Fourier Transform Infra Red
<b>GPS</b>	Global Positioning System
<b>H<sub>2</sub></b>	Hydrogen
<b>h<sup>+</sup></b>	Holes
<b>hν</b>	Photon energy
<b>ICP</b>	Inductive Coupled Plasma.
<b>MB</b>	Methylene blue
<b>meq/l</b>	Milli Equivalent Per Liter.
<b>NM</b>	Nanomaterials
<b>OH<sup>·</sup></b>	Hydroxyl radical
<b>O<sub>2</sub></b>	Oxygen
<b>ppm</b>	Part Per Million

## **Abbreviations**

<b>Abbreviations</b>	<b>Meaning</b>
<b>RSC</b>	Residual Sodium Carbonate
<b>SAR</b>	Sodium Adsorption Ratio
<b>SEM</b>	Scanning Electron Microscopy
<b>TDS</b>	Total dissolved salts
<b>TH</b>	Total hardness
<b>TiO<sub>2</sub></b>	Titanium dioxide
<b>TOC</b>	Total organic carbon
<b>UV</b>	Ultra violet
<b>VB</b>	Valence band
<b>WHO</b>	World Health Organization
<b>XRD</b>	X-ray diffraction

## **ABSTRACT**

**Fatma Mohamed Elsayed. Synthesis of hybrid organic – inorganic materials for polluted groundwater treatment San El- Hager – East Delta – Egypt Unpublished MS.C.thesis, Chemistry Department, Faculty of Science, Ain Shams University, 2018.**

The present study deals with the hydrogeochemistry of San El-Hager which is a part of East Delta, Egypt. It is located between longitudes of  $31^{\circ} 49'$  to  $31^{\circ} 58'$  E and latitudes of  $30^{\circ} 50'$  to  $31^{\circ} 30'$  N. Throughout the area of consideration the main ground water aquifer is quaternary aquifer, which represented by 10 groundwater samples. Also, the surface water (10 samples) represented the canal and drain is second water resources in this area. The majority of water (groundwater, surface water) samples (50 %) are related to brackish, 40 % is saline to extremely saline and only 10 % is fresh water types. The chemical water type of all of samples is chloride – sodium, except one sample No (9) is sodium- sulfate. According to the total dissolved solid, all water samples (ground, surface water) are unsuitable for human drinking except one sample (No 20, canal) has 829.62 mg/L. According to chemical oxygen demand (COD) , biochemical oxygen demand (BOD) and total organic carbon (TOC), all samples (ground and surface waters) have more than the acceptable level of pollution of COD, TOC. The area suffers from high polluted water and shortage of water resources. So, Nano- materiales titanium dioxide nanoparticle and copper oxide nanoparticle were prepared