

18-24 June, 2015, Bulgaria

**15th INTERNATIONAL MULTIDISCIPLINARY
SCIENTIFIC GEOCONFERENCE
SGEM 2015**

Ecology, Economics, Education and Legislation
CONFERENCE PROCEEDINGS
Volume I

ECOLOGY &
ENVIRONMENTAL PROTECTION



DISCLAIMER

This book contains abstracts and complete papers approved by the Conference Review Committee. Authors are responsible for the content and accuracy.

Opinions expressed may not necessarily reflect the position of the International Scientific Council of SGEM.

Information in the SGEM 2015 Conference Proceedings is subject to change without notice. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of the International Scientific Council of SGEM.

Copyright © SGEM2015

All Rights Reserved by the International Multidisciplinary Scientific GeoConferences SGEM
Published by STEF92 Technology Ltd., 51 "Alexander Malinov" Blvd., 1712 Sofia, Bulgaria
Total print: 5000

ISBN 978-619-7105-39-1

ISSN 1314-2704

DOI: 10.5593/sgem2015B51

INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE SGEM
Secretariat Bureau

Phone: +359 2 4051 841
Fax: +359 2 4051 865

E-mails: sgem@sgem.org | sgem@stef92.com
URL: www.sgem.org

ORGANIZERS

- BULGARIAN ACADEMY OF SCIENCES
- ACADEMY OF SCIENCES OF THE CZECH REPUBLIC
- LATVIAN ACADEMY OF SCIENCES
- POLISH ACADEMY OF SCIENCES
- RUSSIAN ACADEMY OF SCIENCES
- SERBIAN ACADEMY OF SCIENCES AND ARTS
- SLOVAK ACADEMY OF SCIENCES
- NATIONAL ACADEMY OF SCIENCES OF UKRAINE
- INSTITUTE OF WATER PROBLEM AND HYDROPOWER OF NAS KR
- NATIONAL ACADEMY OF SCIENCES OF ARMENIA
- SCIENCE COUNCIL OF JAPAN
- THE WORLD ACADEMY OF SCIENCES (TWAS)
- EUROPEAN ACADEMY OF SCIENCES, ARTS AND LETTERS
- ACADEMY OF SCIENCES OF MOLDOVA
- MONTENEGRIN ACADEMY OF SCIENCES AND ARTS
- CROATIAN ACADEMY OF SCIENCES AND ARTS, CROATIA
- GEORGIAN NATIONAL ACADEMY OF SCIENCES
- ACADEMY OF FINE ARTS AND DESIGN IN BRATISLAVA
- TURKISH ACADEMY OF SCIENCES
- BULGARIAN INDUSTRIAL ASSOCIATION
- BULGARIAN MINISTRY OF ENVIRONMENT AND WATER

HONORED ORGANIZER



BULGARIAN ACADEMY OF SCIENCES

EXCLUSIVE SUPPORTING PARTNER



INTERNATIONAL SCIENTIFIC COMMITTEE
Ecology, Economics, Education and Legislation

- PROF. DR. L. LAVRYSEN, BELGIUM
- PROF. DR. JÜRGEN H. BREUSTE, AUSTRIA
- PROF. LIDIA CRISTEA, ROMANIA

124. THE LEACHING AND MIGRATION OF A LNAPL CONTAMINANT IN THE UNDERGROUND ENVIRONMENT OF THE TERRACE SEDIMENTS OF THE TARNAVA RIVER , PhD student Tiberiu Doru Cioban, Prof. Dr. Ioan Aurel Irimus, Ioana Madalina Rus, Monica Ilies, Florica Silaghi, Babes-Bolyai University, Romania.....	933
125. THE OIL PRODUCTS ACCUMULATION IN BOTTOM SEDIMENTS OF SMALL RIVERS OF KALININGRAD REGION FLOWING INTO THE CURONIAN LAGOON , Elena Demenchuk, Olga Ryabkova, Immanuel Kant Baltic federal university Geography and Geoecology Faculty, Russia.....	941
126. THE PROTECTED AREA STRONGLY INFLUENCED BY IMPACT OF THE TOURISM IN THE DEMANOVA VALLEY , Dr. Ivana Tomcikova, Dr. Iveta Rakytova, Catholic university in Ruzomberok, Slovakia	945
127. THE TREATMENT OF SALTY MINE WATER IN CONSTRUCTED WETLANDS , Ing. Petra Langerova, RNDr. Novakova Jana, Ph.D., Mgr. Melcakova Iva, Ph.D., VSB-Technical University of Ostrava, Czech Republic	953
128. THE VENTILATION RATE DETERMINATION IN THE OFFICE ROOMS , Peter Kapalo, Florin Domnitae, Eva Kridlova Burdova, Richard Nagy, Martina Rysulova, Technical University of Kosice - Faculty of Civil Engineering, Slovakia	961
129. TiO₂: SOLAR LIGHT PHOTOCATALYSIS A PROMISING TREATMENT METHOD FOR WASTEWATER WITH TRINITROTOLUENE CONTENT , Dr. Ines Nitoi, Lucian-Alexandru Constantin, Prof. Dr. Petruta Oancea, Ionut Cristea, Dr. Maria Crisan, National Research and Development Institute for Industrial Ecology - ECOIND, Romania.....	696
130. TOP DOWN STRATEGIES AND BOTTOM UP INITIATIVES IN GEOPARKS DEVELOPMENT IN SLOVAKIA , Roberta Stepankova, Katarina Kristianova, Slovak Agriculture University in Nitra, Slovakia.....	977
131. URANIUM IN AEROSOL OF NUCLEAR FUEL CYCLE ENTERPRISES REGION (NOVOSIBIRSK, RUSSIA) , Svetlana Artamonova, Sobolev V.S. Institute of Geology and Mineralogy Siberian Branch of the Russian Academy of Sciences, Russia	985
132. URBAN ECOLOGY: ASSESSMENT OF THE POLLUTANTS ACUMULATION IN SEDIMENTS FROM THE COLENTINA LAKES IN BUCHAREST , Stanescu Bogdan, Stanescu Elena, Batrinescu Gheorghe, Kim Lidia, Cuciureanu Adriana, National Reserach and Development Institute for Industrial Ecology - ECOIND, Romania.....	993

133. USE OF ION EXCHANGE PROCESSES ON WEAK ACID RESINS FOR NICKEL REMOVAL FROM WASTE WATERS , Alexandra Raluca Miron, PhD.Daniela – Elena Pascu, Oanamari Daniela Orbulet, Simona Caprarescu, Cristina Modrogan, Politehnica University of Bucharest, Romania.....	999
134. USE OF NATURAL RESOURCES FOR SUSTAINABLE DEVELOPMENT AND GLOBALIZATION , Ada Flavia Cristina, Camelia Manescu, Teodor Mateoc, Attila Toth, Nicoleta Mateoc-Sirb, Banat University of Agronomical Sciences and Veterinary Medicine, Romania.....	1007
135. USING THE GEORADAR METHOD (GPR - GROUND PENETRATION RADAR) FOR SEARCHING AND LOCATION OF INACCESSIBLE OR UNKNOWN, HISTORIC UNDERGROUND EXCAVATIONS , PhD.Madziarz M., Wroclaw University of Technology Faculty of Geoenineering Mining and Geology, Poland	1015
136. VEGETATION, A STABILITY FACTOR IN SLOPE MODELING. CASE STUDY: VULCANA BAI COMMUNE , Lecturer dr. Mihaela Sencovici, Valahia University of Targoviste, Romania	1023
137. URBAN TRAM INDUCED VIBRATIONS: REAL TIME MONITORING OF HISTORICAL BUILDINGS IN THE CENTRE OF ROME , G. Alfaro Degan, G. Coltrinari, D. Lippiello, Roma Tre University, Italy.....	1031
138. WATER FOOTPRINT, CARBON FOOTPRINT, ENERGY FOOTPRINT GENERAL ASPECTS AND THEIR INFLUENCE ON SOCIETY , Mihaela Pisleaga, Alina Girbaci, Cristian Girbaci, Politehnica University of Timisoara, Romania.....	1039
139. WEB PLATFORM TO IMPROVE THE PUBLIC AWARENESS ON ENVIRONMENTAL MANAGEMENT AND PROTECTION , PhD Vergil Marian Muraru, PhD Cornelia Muraru-Ionel, Math. Petru Cardei, Eng. Raluca Sfiru, Techn. Tania Ticu, INMA Bucharest, Romania.....	1047
140. YIELDING CAPACITY AND QUALITY OF TOMATO FRUITS AT DROP IRRIGATION WITH ELECTROCHEMICALLY ACTIVATED WATER IN LIGHT-CHESTNUT SOILS OF THE LOWER VOLGA REGION , Prof. Dr. Sergey Semenenko, Prof. Dr.Victor Borodychev, Prof. Dr. Elena Ivantsova, Dr. Michail Lytov, Volgograd State University, Russia	1055

- [10] Kubeckova D., Vlcek P., Kubecka K., Environmental aspects of the designing of buildings, 4th International Multidisciplinary Scientific Conference SGEM 2014, Energy and Clean Technologies, Albena, Bulgaria, Conference Proceedings Book 5, vol. 3, ISSN 1314-2704, pp 135-142;

TiO₂ SOLAR LIGHT PHOTOCATALYSIS A PROMISING TREATMENT METHOD OF WASTEWATER WITH TRINITROTOLUENE CONTENT

Dr. Ines Nitoi¹

Lucian-Alexandru Constantin^{1,2}

Prof. Dr. Petruta Oancea³

Ionut Cristea¹

Dr. Maria Crisan⁴

¹ National Research and Development Institute for Industrial Ecology - ECOIND, **Romania**

² University Politehnica of Bucharest, **Romania**

³ University of Bucharest, **Romania**

⁴ "Ilie Murgulescu" Institute of Physical Chemistry, Romanian Academy, **Romania**

ABSTRACT

2,4,6-Trinitrotoluene (TNT) is the most common pollutant identified in wastewater generated from munitions plants where this explosive is synthesized or handled (munitions load, assembly and pack operations). Due to their toxic and suspected carcinogenic characteristics, nitroaromatic compounds like TNT are included on the list of priority pollutants and strictly regulated in EU countries. Since their presence in water bodies is risky for human health and aquatic life, development of powerful, modern treatment methods like photocatalysis are needed in order to assure environmental pollution mitigation.

The photocatalytic degradation of TNT was carried out at pH=7.8, in aqueous TiO₂ based catalyst suspension, under sunlight irradiation. The enhanced photo activity of catalyst in visible domain was assured by 0.5% Fe doping.

TNT degradation experiments were performed using a tubular collector type solar photoreactor (26 UV permeable silica glass tubes series connected), plug in a total recycle loops. The influence of substrate concentration and catalyst dose on the pollutant degradation and mineralization by-products (NO₂⁻, NO₃⁻, NH₄⁺) formation efficiencies was studied.

In order to compare the experimental results obtained in various working conditions, the pollutant and mineralization by-products measured concentrations have been considered as functions of irradiation time and cumulative photonic energy Q incident on the reactor surface (kJ/L).

In the tested experimental conditions, at tens mg/L pollutant concentration, increase of 0,5wtFe%-TiO₂ dose up to 200mg/L leads to the enhancement of TNT degradation efficiency. Since, doubling of TNT content has a negative effect on pollutant degradation efficiency, in similar experimental condition, prolonged irradiation time from 360 to 480 min was necessary in order to assure the compliance of treated effluent with limits imposed by EU legislation (TNT≤10µg/L).

Keywords: Wastewater treatment, TNT, photocatalysis