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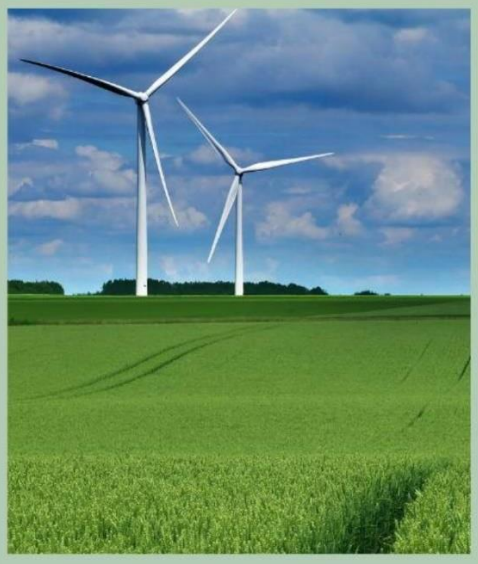
ESWAE-2021

08 – 10 July 2021 | Cyprus Science University | Ozankoy-Kyrenia, Cyprus



ABSTRACTS BOOKS

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08 – 10 July 2021

ABSTRACTS BOOKS

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KEYNOTES

Prof. Dr. Ana Cláudia Carvalho Campina
Portugal

Keynote Title: "*Human Rights in the environmental policy of the European Union"*

Abstract: The Humanity faces its highest challenge, despite dangerous disregard from people, states and international organizations, although all politics, education and official and non-official entities and structures: maintain the environmental sustainability and avoid the destruction of the planet by the human behavior changing our planet provoking absolutely frightening and dangerous (millions) deaths.
As Human Rights (fundamental and procedural rights) the environment has to be in the top of the concerns and due this, one of the most important legal measure was the Paris Agreement (UN, 2015) adopted by 196 countries, binding legally and aiming to prevent the climate change, limit global warming and reach global peaking of greenhouse gas emissions. However, the time is running, and the situation is being achieving the limit to the Planet and to the Humanity.

The European Union has some of the highest environment standards developed by policies, since economic concern, protection of natural resources, working to be legal, political and social safeguards of the health and wellbeing of people from their states members. However, more than an objective, the policies and the legal demands, particularly the European Environment Agency and European Institutions are working to improve its own environment performance in straight connection with International Organizations and states, as safeguarding citizens from environment-related pressures and risk to health. Our research aims to analyze the climate change as a global problem, considering that in similitude with all over the world, from global politics and business to the climate change and the food eaten, the European Union is particularly protecting the environment sustainable as Human Right treated as a higher priority, as the scenario is becoming worst with more than 400 deaths per year in Europe due the different environment deterioration.

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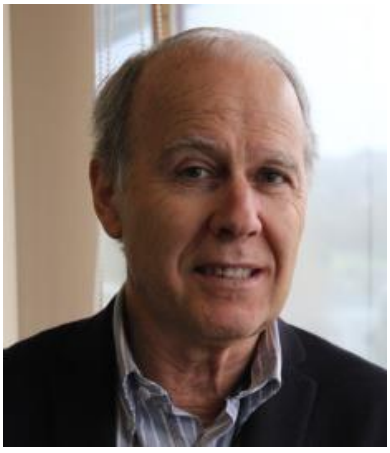

Prof. Dr. Carlos Rodrigues
Portugal

Keynote Title: "*Human Rights in the environmental policy of the European Union"*

Abstract: The Humanity faces its highest challenge, despite dangerous disregard from people, states and international organizations, although all politics, education and official and non-official entities and structures: maintain the environmental sustainability and avoid the destruction of the planet by the human behavior changing our planet provoking absolutely frightening and dangerous (millions) deaths.
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Short Bio *Carlos Rodrigues:* PhD European Tax Law; Professor in Universidade Fernando Pessoa (UFP), Porto, Portugal; Visiting Professor in SVTFaculdade – Brazil; Researcher in IJP Portucalense Institute for Legal Research; Lecturer of Gonçalves Dias Chair – Brazil; Ex-Principal Advisor Tax and Customs Authority; Legal Consultant.
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Prof. Dr. Ilija Nasov
Skopje, Northern Macedonia

Keynote Title: "*Will be announce…"*

Abstract: *Will be announce…*

Waste Heat Recovery From Blast Furnace Slag with Supercritical CO2 Power Cycles and Thermo-Economic Analysis

Ahmet Can Bektaş, Yıldız Technical University-Graduate School of Science And Engineering

Ali Volkan Akkaya, Yıldız Technical University

Abstract

The 1773-1973 K (1450-1650°C) blast furnace slag (BFS) that occurs in iron production is processed by water quenching to be used in cement production and its high amount of heat energy cannot be recovered. Instead of water quenching, centrifugal dry granulation (CDG) method is used to recover waste heat and reduce water consumption. In addition, the emission of harmful gases can be prevented. In this study, centrifugal dry granulation as a cooling method and 4 different supercritical CO2 (sCO2) cycles for recovery of waste heat were proposed for a facility producing 35 tons of BFS per hour. CDG and sCO2 Brayton power cycles were modeled according to the first law of thermodynamics and parametric analyzes were made. In the CDG model, the energy consumed by the granulation system was calculated according to the mass flow rate of the slag and the heat energy transferred to the air by the BFS was evaluated. Hot air from dry granulation was used as the heat source for sCOs power cycles. Modeled power cycles are regenerative, pre-compression, recompression and partial heating sCO2 Brayton cycle. The effects of maximum pressure, pressure ratio and turbine inlet temperature on net power output and thermal efficiency were investigated in parametric analyzes of sCO2 cycles. As a result of the analyzes, the highest thermal efficiency was the recompression sCO2 cycle with 46.1%, and the highest net power output cycle was the partial heating sCO2 cycle with 3366 kW at the same maximum pressure and turbine inlet temperature. When the thermal efficiency of the whole system (CDG-sCO2) is examined, partial heating provides the highest efficiency with 18,23%, the other three sCO2 cycles have thermal efficiency in the range of 14-15%. In addition, the temperature of the exhaust gas (hot air) from the sCO2 cycles varies in the range of 460-610 K. By using the exhaust gas in organic Rankine cycle (ORC), the thermal efficiency and net power output of all systems can be further increased. To see the usability of these power cycles, they were compared with the simplesteam Rankine cycle. The net power output from the steam Rankine cycle is 2515 kW and the efficiency of the entire systemis 13.27%. Higher data were obtained in the four sCO2 power system compared to the steam Rankine cycle. According to the quenching method, present worth of the income that the CDG-sCO2 power systems will generate during their economic life are calculated.

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FORECASTING OF DAILY DAM OCCUPANCY RATE USING LSTM NETWORKS

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Melike Erdogan, Duzce University

Abstract

Due to unconscious consumption of natural water resources and climate change, available resources are also rapidly depleted. It is predicted that this demand for water will increase even more in the coming years. As a result of the increasing demand, a water crisis is also expected in the upcoming years. At this point, it is necessary to knowing in advance about the water levels in the dams and develop strategies for water-saving applications in the coming periods. In this study, we proposed an artificial neural networks (ANN) model for forecasting the water in the dams that provide usable water for future. For this aim, long short-term memory (LSTM) networks that is a type of recurrent neural networks (RNN) are employed to make future forecasts. The daily dam occupancy rate data between 2005-2021 for İstanbul is used to train the LSTM network. Different LSTM networks are created to achieve better accuracy on the prediction. Then the developed models are used to forecast over the next day, 7 days and 30 days. The data is used in traditional methods such as ARMA, SARIMA, and ARMAX to model the daily dam occupancy time series, for a fair comparison. The forecast values gained by the proposed LSTM network are compared with the traditional methods using RMSE for all the forecast horizons. The results show that the LSTM based forecast model always has better accuracy rate than the other traditional methods.

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COBALT-NICKEL BORATE WITH KOTOITE STRUCTURE BASED HYBRID MATERIAL AS WATER OXIDATION ELECTROCATALYST

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Samuei, Bilkent University, Faculty of Sciences ,Department of Chemistry, Ankara, Turkey **Ferdi**

Karadas, Bilkent University, Faculty of Sciences ,Department of Chemistry, Ankara, Turkey **Emine**

Ülker, Recep Tayyip Erdogan University, Science and Arts Faculty Department of Chemistry

Abstract

Due to the negative consequences of the use of fossil fuels such as environmental problem, hazardous greenhouse gas emissions, change in atmospheric equilibrium and the gradual depletion of fossil fuels, the need for clean alternative energy is increasing [1,2]. Water splitting including hydrogen evolution reaction (OER) and oxygen evolution reaction (OER) is a clean way to transform electric energy into chemical fuels stored by hydrogen, which has high energy density [3]. However, OER is the critical step for water splitting process because of its high overpotential for four electron transfer. Therefore, efficient, low-cost and stable catalysts are needed to overcome this problem. One way of obtaining such a catalyst is to hybridize with carbon-based materials such as carbon nanotubes and graphene. In this study, cobalt-nickel borate [Co2Ni(BO3)2] with a kotoite structure was solid-state synthesized and its hybrid with multi-walled carbon nanotubes (CNTs) was prepared to increase the activity. Electrochemical studies were performed with [Co2Ni(BO3)2] and [Co2Ni(BO3)2@CNT] coated carbon cloth electrode in 1 M KOH solution. [Co2Ni(BO3)2] and [Co2Ni(BO3)2@CNT] requested overpotentials of 420 and 355 mV to reach current densities of 10 mA cm-2, respectively. The combining of CNTs resulted in a decrease of overpotential is assigned to the conductive behavior of CNTs.

ACKNOWLEDGMENT

The research was supported by Science and Technology Council of Turkey, TUBITAK (Project No: 119Z083).

KEYWORDS: Metal borates, Electrocatalysis, Oxygen evolution, Carbon nanotube

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Two-Stage - Multi-Objective Renewable Energy Optimization

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Sultan Kostak, Turkey**Ezgi**

Esi Celep, Turkey

Zehra Kamışlı Öztürk, Turkey

Abstract

Currently, electric energy is a mandatory energy to be used in all areas. All production and consumption activities require electrical energy in the world. Population growth and the development of technology further increase this need, resulting in rapid consumption of natural resources. Since energy use is mandatory in all areas today, the need for renewable energy also increases in parallel with this requirement. Although renewable energy sources are natural and unlimited, their potential for use varies by region. Although the wind potential of Turkey is suitable for obtaining wind energy, its production rate is less than that of foreign countries. For this reason, the study included the establishment of an efficient wind farm in the region to be selected. The facility was intended to be placed both on land and in the sea, and approaches were used to select a suitable coastal city. Since selection problems depend on more than one criteria in real life, the Analytical Network Process (ANP), a Multi-Criteria Decision Making (MCDM) technique, was used as a solution approach in this study. As a result of the model, it was decided to establish a wind turbine farm in Izmir. In the second phase of the study, the selected on-site settlement has been optimized. Three conflicting objective functions were taken into account in the field layout. The first of the objective functions is to minimize the cost, the second one is to minimize the turbine brand and model used, and the third goal is to maximize the total produced power. While wind farm optimization studies generally focused on one objective in the literature, very few of them tried to optimize the two objectives. In this study, in which the appropriate site selection for heterogeneous wind farms and then field optimization was made; turbine model selection, number and location are provided by a multi-objective mixed integer optimization model.

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STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) PROCESS FOR SUSTAINABLE ENVIRONMENTAL BIO-POLYMERS AND BIO-PLASTICS MATERIALS TOWARDS SUSTAINABLE DEVELOPMENT

Vijayan Gurumurthy Iyer, Professional Engineer (India) and Doctor, Co-ordinator of Engineering Council of India (ECI), Diploma in Entrepreneurship and Business Management(DEBM) Counsellor of the Entrepreneurship Development Institute of India (EDII) at Avadi,Chennai, India. Gue

Abstract

ABSTRACT: Strategic environmental assessment (SEA) process can be broadly defined as a study of the impacts of a proposed project,plan, project, policy, or legislative action on the environment and sustainability. The significance of the work entitled "Sustainable Environmental Bio-polymers and Bio-Plastics Technological Applications" is mainly confirmatory as it solves environmental and socialproblems. In this research, the SEA process has been aimed to incorporate environmental and sustainability factors into Sustainablematerials for biopolymer and bio-plastic applications, manufacturing process project planning and decision-making processes such as project formulation and appraisal of wastewater treatment rotating biological contactors, trickling filter bed, biomedical parts, marine biopolymers, Indo-Matsushita midget electrode (battery carbon rod) plant in 1979 at Tada, sustainable bridge, road, and sanitation structure, green building, nuclear power plant, cotton roller ginning plant and concrete that included policies, programs,plans, and legislative actions. Sustainable materials for biopolymer and bio-plastic applications manufacturing process development is a kind of development that meets the needs of the present without compromising the ability and efficacy of future generations to meet their own needs. Environmental Impact Assessment (EIA) process can be defined as the systematic study of the potential impacts (effects) of proposed projects, plans, programs, policies, or legislative actions relative to the physical-chemical, biological, bio-medical, cultural, and socioeconomic components of the total environmental product life cycle. The primary purpose of the EIAprocess is to encourage the consideration of the environment in the Organizational's constructional project planning and decision making (CPPDM) process and to arrive at environmentally compatible actions. The biopolymer and bio-plastic applications material process should include the integrated consideration of technical or engineering, economic, environmental, safety, and health, social, and sustainability factors to achieve business excellence. Before the National Environmental Policy Act (NEPA) process in 1970 in the USA, technical and economic factors dominance the World's Sustainable materials for biopolymer and bio-plastic applications manufacturing process projects. The objective of the study is to conceptualize the SEA process for the Sustainable materials for the biopolymer and bio-plastic applications manufacturing process sector based on fifteen sustainable detailed project reports (DPRs) submitted by the extension learners of the Diploma in Entrepreneurship and Business Management (DEBM) course conducted by the Entrepreneurship Development Institute of India (The EDI of India) during the research year (RY) 1999 to 2021 under the author'scounsellorship. The design of the study is cross-sectional. The limitation or recommendation of the study and check is to apply strategic environmental assessment process for sustainable environmental bio-polymers and bio-plastics materials towards sustainable development.

Keywords: biopolymer, bio-plastics, engineering , technical, sustainable, materials, manufacturing, process, education, embed, environment, industry, management, sustainability.

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THE EFFECT OF COBALT ON ELECTROCATALYTIC PERFORMANCE OF Ni3(BO3)2 ON WATER OXIDATION IN ALKALINE MEDIUM

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Emine Ülker, Recep Tayyip Erdogan University, Science and Arts Faculty Department of Chemistry

Abstract

One of the most critical problems nowadays is the major environmental problems arising from the use of fossil fuels whose resources are running out [1], which revealing the necessity of renewable, clean, and environmental friendly energy source [2]. Many researchers have been investigating stable, low-cost, and abundant electrocatalyst to be used for water splitting, which includes production of O_2 and H_2, promising alternatives for the clean and renewable type of energy without any waste [3,4]. One of the methods used to improve the activity of electrocatalysts is to incorporate a second metal into their structure. In this study, synthesis and characterization of crystalline nickel borate with a Kotoite structure ($Ni_3B_2O_6$) as a water oxidation catalyst have been reported. Also, the effect of introducing a secondary metal ion such as Co by partial substitution of metal sites to water oxidation performances of heterogeneous nickel borate catalyst has been studied. Two additional mixed metal borate with different stoichiometric ratios of Co, which are formulated as $Ni_2CoB_2O_6$ and $NiCo_2B_2O_6$ were synthesized using the same synthetic protocols applied for $Ni_3B_2O_6$. Finally, electrochemical and electrocatalytic water oxidation studies have been performed on metal borates deposited on FTO and CC electrodes in 1 M KOH solution.

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KEYWORDS: Cobalt doping, Electrocatalysis, Metal borates, Oxygen evolution,

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