



American International University-Bangladesh (AIUB)

SDG Activity Report on

SDG 12: Responsible Consumption and Production



**Ensure sustainable
consumption
and production
patterns**

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SDG 12: Responsible Consumption and Production

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University Activities

WEBINAR ON “SUPPLY CHAIN MANAGEMENT: USER’S CONTEXT TO MAXIMIZE CUSTOMER VALUE”

The Department of Operations and Supply Chain Management (OSCM), AIUB organized a webinar on “Supply Chain Management: User’s Context to Maximize Customer Value” on March 22, 2021 from 12.30 pm to 02.00 pm. The target audience of this webinar was students of Purchasing and Procurement: a major course of OSCM. The guest speaker of the webinar was Ms. Mehnaz Kabir, Director - Sales EATL, Huawei Local Partner. The webinar was to enhance the student’s academic learning and to make them understand the real-life examples of how procurement activities take place in any multinational organization and corporate world to add more values in supply chain in order to create more customer value as it is said that if the procurement can be done in an efficient way in terms of quality, performance, timely delivery of accurate items in accurate quantity it helps to bring the product in customers hand on time and as per requirement which is the key to enhance customer value.

The guest speaker also provided tips and techniques on how to become successful in corporate world from her twenty years professional experience; primarily in Telecommunications industry with major tenure in Grameenphone with diverse experience and exposure in different roles and later, with Ericsson Bangladesh as Head of Communications and RanksTel as the Chief Communications Officer followed by a multifaceted portfolio with Rangs Group as the Group Chief Marketing Officer and British American Tobacco (BAT) Bangladesh, as the Head of Corporate Affairs department. She was also awarded as one of the 50 Brand Leaders in Asia by CMO Asia in 2017 for her contribution in brand building and communications. The speaker delivered an informative speech and shared her valuable expertise on this subject matter focusing issues such as proper planning and execution is required in every step of supply chain. At the end, the session was opened for students to ask questions. The question-and-answer session indicated that the webinar was effective and fruitful for the students, it showed that the topic was interesting to them because of its relevancy with OSCM. The guest speaker appreciated students for their interactive participation. Prof. Dr. Charles C. Villanueva, VP, Academics and Dean, Faculty of Business Administration inaugurated the webinar with a welcome speech and Prof. Dr. Nisar Ahmed, MBA Program Director and acting Head of OSCM Department delivered the vote of thanks to the guest speaker. The webinar was coordinated by Ms. Shahnaz Zarin Haque, Assistant Professor, Department of OSCM, FBA. The Department of Operations and Supply Chain Management (OSCM) humbly appreciates the support extended by the AIUB management.



Online Seminar entitled “The Impact of COVID 19 on Consumer Behavior and Culture”

The Department of Marketing, Faculty of Business Administration, AIUB organized an online seminar in the class for the students of Consumer Behavior, Section A, BBA Program, on July 22, 2020 from 11:00 am to 12.30 pm by using the Zoom Video Conferencing Application platform.

The keynote speaker was Dr. Minowa Yuko, Professor of Marketing, Long Island University, New York, USA. Dr. Yuko obtained her Ph.D. from Rutgers, the State University of New Jersey, USA. She has a long experience of teaching Consumer Behavior and other marketing related courses with having too many articles on consumer behavior and culture. In addition, she is a member of American Marketing Association, and Association for Consumer Research. She was awarded by different well reputed business organization like AMA, AAF and so on.

She had covered the world’s Consumers’ behave toward purchasing products and services cause of world Pandemic- COVID 19. As she stated consumers are depending on online purchasing more than ever and purchasing daily grocery more than any others which are not important. Consequently, Domino’s Pizza had to hire 10,000 more employees to serve people in their home in this Pandemic Situation while many people are being fired throughout world.

Moreover, Prof. Yuko mentioned about Fear of Missing out (FOMO) marketing technique to boost sales. Business people ought to invest money on online business to make the business digitalized in fierce competitive markets.

The expected outcome of this event enable the students to practice their Cognitive knowledge giving attention to Customers’ emotions, Personalities, Demographical, Socio economic, Socio culture and change in e-commerce amid and post COVID 19.

Prof. Dr. Charles C. Villanueva, Vice President (Academics), and Dean, Faculty of Business Administration allowed Mr. AKM Kamrul Haque, Senior Assistant Professor, from the Department of Marketing, FBA, to arrange and initiate for the students to enrich and widen their appreciation and understanding of the course Consumer Behavior. Ms. Farheen Hassan, Associate Professor, and Director, BBA Program, and Dr. Khondaker Sazzadul Karim, Associate Professor, and Head, Department of Marketing, provided the needed support to ensure the success of the event considering that Prof. Yuko is a foreigner.

The FBA Management sincerely expressed its deep appreciation and valuable thanks to Prof. Yuko for sharing her precious time and effort to share her utmost knowledge and experience with the students in the midst of this pandemic situation raging the world.



Seminar on “Journey of an Entrepreneur”

AIUB Community of Engineering Students (ACES) organized a seminar titled "Journey of an Entrepreneur" on 6th November, 2019 at AIUB campus. The purpose of this seminar was to help the students gain knowledge on how to pave the way to being an entrepreneur and encourage them for planning their future goals from now. The program started at 4:00 pm with the participation of about 80 students.

Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB*) inaugurated the seminar by welcoming the students along with the guests with an insightful speech. He enlightened the fact, that Entrepreneurs are uprooting the problems which society is facing by innovative ideas and the youth should follow the footsteps of the entrepreneurs, who have already made effective and monumental change in the society.

The speaker Sylvana Quader Sinha (*Founder, Chairman, & CEO, Praava Health*) was welcomed to deliver her speech and she started her speech by thanking everyone. She talked about how she managed to gather enough experience by working at various distinguished places around the world. She said that the idea of solving the problems of the healthcare system in Bangladesh came up when she visited the hospital in Bangladesh due to her mother's sickness. She explained the challenges she faced throughout the journey to being an entrepreneur. She mentioned that, an entrepreneur must have to research and have full knowledge about what one is going to do with the company and how this can solve problems of the country. She remarked that entrepreneurship is not about just building up a company but also to keep working on the promises and updating the policies so that the company can keep pace with the advancing world. After that, Abdullah Al Saleh Ananda (*System Analyst, Praava Health*) was welcomed. He mentioned that starting anything new is not an easy work, one has to give efforts for years with deep patience to become a successful entrepreneur. He also stated that Electronics, biomedical, IT and civil engineers are working with them in Praava Health. He ended his speech by informing the students that they are looking for interns. Later on, free consultancy coupons were handed over to all the participants.

Prof. Dr. Mohammad Abdul Mannan (*Director, Faculty of Engineering, AIUB*) announced the closing of the seminar by thanking the guest speakers, students and ACES for organizing the event successfully. Afterwards, he gave the token of appreciation to the guests of the seminar. Mr. Abul Hasnat (*Assistant Professor, Faculty of Engineering, AIUB*), Mr. S. M. Imrat Rahman (*Senior Lecturer, Faculty of Engineering, AIUB*) and Mr. Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB & Motivator, ACES*) graced the seminar with their presence.

Faculty Research and Publication

Design and Evaluation of a 32-bit Carry Select Adder using 4-bit Hybrid CLA Adder

Author: Farhadur Arifin et al.

Brief Description:

Adder circuits play a remarkable role in modern microprocessor. Adders are widely used in critical paths of arithmetic operation such as multiplication and subtraction. A Carry Select Adder (CSA) design methodology using a modified 4-bit Carry Look-Ahead (CLA) Adder has been proposed in this research. The proposed 4-bit CLA used hybrid logic style based logic circuits for Carry Generate (Gi) and Carry Propagate (Pi) functions in order to improve performance and reduce the number of transistor used. The modified 4-bit CLA is used as the basic unit for implementation of 32-bit CSA. The proposed design of hybrid CLA based 32-bit CSA has been compared with conventional static CMOS based 32-bit CSA and 32-bit Ripple Carry Adder (RCA) by conducting simulation using Cadence Virtuoso. Power consumption and delay in the proposed 32-bit CSA found 322.6 (uW) and 0.556 (ns) whereas power and delay in the conventional 32-bit CSA was 455.4 (uW) and 0.667 (ns) respectively. We have done all the simulation using Cadence Virtuoso 90 nm tool.

Source: <https://ajse.aiub.edu/index.php/ajse/article/view/119>

Design of a Robust ESD Protection Device using 6H-SiC Nano-Scale GGNMOS

Author: Farhadur Arifin et al.

Brief Description:

With the continuous shrinking of the technological nodes and the introduction of new device concepts and materials, integrated circuits (IC) are becoming more vulnerable to electrostatic discharge (ESD) induced failures which is one of the major concerns in designing robust ICs. Therefore, to improve the reliability of the ICs against ESD induced failures, extensive research efforts are being conducted. In this paper, we have presented a 6H-SiC based nano-scale grounded-gate NMOS (ggNMOS) ESD protection device and compared the results with the 3C-SiC-based ggNMOS. To design a robust ESD protection device, some critical device parameters, such as substrate doping concentration, source/drain doping concentration, drain to substrate contact spacing, and substrate contact resistance should be optimized. The ESD protection characteristics can be improved by utilizing the near punch-through effect. It was found that the trigger voltage and hold voltage are higher in 6H-SiC than the 3C-SiC having identical device parameters. 6H-SiC shows better voltage clamping performance as the turn-on resistance of 6H-SiC is smaller compared to the 3C-SiC material. Therefore, the results show that 6H-SiC has a

better performance compared to 3C-SiC and due to its higher bandgap, and can be used as a good ESD protection device. All the simulations are carried out using the Silvaco ATLAS device simulator.

Source: <https://ajse.aiub.edu/index.php/ajse/article/view/132>

The Effects of the Substrate Doping Concentrations on 6H-SiC Nano-Scale ggNMOS ESD Protection Device

Author: Farhadur Arifin et al.

Brief Description:

With the continuous miniaturization of device size, integrated circuits (IC) are becoming more vulnerable to electrostatic discharge (ESD) induced failures. To improve the reliability and robustness of the ICs, ESD protection devices should be used at each I/O pin. In this paper, the effects of the substrate doping concentrations of 6H-silicon carbide-based nano-scale grounded-gate NMOS (ggNMOS) ESD protection device on the snapback behavior has been investigated. The substrate doping concentration is one of the most important design parameters in designing a robust ESD protection device. By utilizing the near punch through effect, the ESD protection characteristics can be improved. We found that the trigger and hold voltages of the snapback curves had increased by increasing the substrate doping concentrations of ggNMOS. The results show that comparatively higher doping concentration can be used to achieve higher trigger and hold voltages which can be used for 5 V applications. All the simulations are carried out using Silvaco ATLAS device simulator.

Source: <https://ieeexplore.ieee.org/abstract/document/9331030>

Design and Evaluation of a FIR Filter Using Hybrid Adders and Vedic Multipliers

Author: Farhadur Arifin et al.

Brief Description:

In this paper, FIR filter of 45nm technological node has been presented, which is a basic filter in DSP applications. Hybrid Adder has been introduced to improve cost and power consumption of the circuit. A Vedic multiplier and D-type register have also been introduced in the proposed FIR filter. 2-bit 4 tap direct and transposed form of FIR filter have been designed for computational data comparison. Results show that the hybrid adder design has almost 6 times lower power

consumption than our conventional Adder using complementary CMOS logic. The smaller number of Delay elements of direct-from FIR further reduces power consumption, area and transistor numbers. Therefore, by using our circuits, the overall performance and power consumption of FIR filter has been improved significantly. To implement the circuits, DSCH software has been used and to design the layout, Microwind has been used.

Source: <https://ieeexplore.ieee.org/document/9331063>

A Proposed Design of Conventional 4-Bit Carry Look-Ahead Adder Improving Performance

Author: Farhadur Arifin et al.

Brief Description:

This paper presents a method towards the improved performance parameters of conventional CMOS based 4-bit carry look-ahead adder. Conventional CLA adder has high numbers of transistors and high input impedance due to which various performance aspects are affected. Due to high input impedance, its delay and power consumption are high. Therefore, to increase the performance and to reduce delay, we have proposed an advanced version of CLA adder where hybrid logic based XOR gate and GDI AND gates have been used as input to reduce the transistor count as well as to improve performance. Finally, performance of modified adder has been compared with the conventional CLA adder. We have noticed that modified CLA adder showed better performance than the conventional CLA adder. Simulation has been done with Cadence virtuoso 90nm technology.

Source: <https://ieeexplore.ieee.org/document/9213227>

Unsupervised method of clustering and labeling of the online product based on reviews

Author: Md Masum Billah et al.

Brief Description:

This paper presents an unsupervised approach to cluster reviews of products collected from Amazon and then generates its labels of each cluster. Instead of using a complete review, this paper splits a review into sentences and considers all sentences from the reviews as inputs for Clustering. Hierarchical Agglomerative Clustering (HAC) is used to cluster sentences. The approaches of cluster labeling are also unsupervised. For labeling, three different methods have been used to find a limited number of essential words for each cluster. Extracted essential words are used to construct phrases. Constructed phrases are used as labels for each cluster. This paper

compares the result of the labeling method with baseline labeling. In the result evaluation, all the labeling methods outperform the baseline method. The aim of this research is cluster labeling that makes a set of labels to describe a cluster content and distinguishes the labels from other cluster labels.

Source: <https://www.worldscientific.com/doi/abs/10.1142/S1793962321500173>

Proposing a System Model for Safe Device Charging.

Author: Susmita Ghosh et al.

Brief Description:

Energy delivery of an electrical device performs a first-rate role in every digital gadget as it controls, regulates and distributes DC strength for the gadget. In this paper a variable DC energy source is being used with an external safety circuit. The Dc source is designed by Arduino with pulse width modulation (PWM) based manipulate circuit along with MOSFET for switching operation. The principle characteristic of our project work is to adjust the output voltage by means of PWM manipulation and by controlling the PWM ripple voltage. In order to do that the pulse width is varying with the modifications inside the DC output voltage stage which will change the pulse width that will arise an output voltage. As a result, the output voltage may be numerous respectively with the versions of load.

Link: <https://ieeexplore.ieee.org/document/8959975>

Proposing a Technique of a Low Cost Automatic Cooling and Exhaust System for Old Age Home Kitchen.

Author: Susmita Ghosh et al.

Brief Description:

This paper illustrates an automatic temperature control and exhaust system, specially designed for the kitchen. Microcontroller (AT mega 328p) is being used that operates the system with the help of temperature sensor LM35 and by using a temperature measurement code. Temperature measurement coding is done using Arduino software, loaded through Arduino UNO board into AT mega 328p. Finally, a 4channel relay module is used that works as a switch to turn on two different motors employed for two different purposes (temperature control and exhaust system). This system is specially designed for the kitchen of old age home with a mind of keeping the rate cheaper compared to other existing systems available in the market. Cost of the entire system has been analyzed in the paper and it is verified that the system is low-priced compared

to other existing systems. So, this design can be used mainly in the kitchen as a low-cost cooling and exhaust device.

Link: <https://ieeexplore.ieee.org/document/8869220>

Renewable Energy Based Smart Railway Crossing System with Obstacle Detector.

Author: Susmita Ghosh et al.

Brief Description:

Accidents are happening in our country at the unmanned railway crossings. The main reason behind these accidents is less safety measures in the railway system. Our country uses traditional system where gate is closed by man during arrival of a train manually. This is the main reason of accidents. The main objective of our project is to prevent these accidents in the railway crossing. In the railway system time consumption is a common problem. Our project can manage time consumption and control the system using arduino. IR sensor can recognize the train and motor driver to open and close the gate. Our project has been designed successfully. It can be developed by updating features. The main reason for making our project is to overcome the disadvantages of current railway system. Our project allows highest safety. We did not have proper funding for the project. As a result, we could not obtain expected results. In near future we will work more with this project.

Arduino based automatic power factor control

Author: Dr Mohammad Hasan Imam et al.

Brief Description:

When the inductive load is brought into the industry, it is known that the power factor will drop. The electricity cost will be greater if the power factor is decreased. When power factor drops in our system, the automated capacitor bank is activated, and power factor is restored to a predetermined level. The unique element of our project is that an IoT (Internet of Things) technology was used to complete it. It will be able to monitor and operate the project from any place on the Internet, in addition to monitoring from the project display. As a programming device, it has been utilized an Arduino Uno Microcontroller. The PF may be improved to increase current-carrying capacity, enhance voltage to equipment, minimize power losses, and cut electric costs. Reactive current generators are PF correction capacitors. We contribute to increasing the power factor by helping to balance the nonworking power used by inductive loads ...

Source:

https://scholar.google.com/citations?view_op=view_citation&hl=en&user=N2DHysAAAAAJ&so rtby=pubdate&citation_for_view=N2DHysAAAAAJ:L8Ckcad2t8MC

Selective Transformations of Triglycerides into Fatty Amines, Amides, and Nitriles using Heterogeneous Catalyst

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

The use of triglycerides as an important class of biomass is an effective strategy to realize a more sustainable society. Herein, three heterogeneous catalytic methods are reported for the selective one-pot transformation of triglycerides into value-added chemicals: i) the reductive amination of triglycerides into fatty amines with aqueous NH_3 under H_2 promoted by ZrO_2 -supported Pt clusters; ii) the amidation of triglycerides under gaseous NH_3 catalyzed by high-silica H-beta ($\text{H}\beta$) zeolite at 180°C ; iii) the $\text{H}\beta$ -promoted synthesis of nitriles from triglycerides and gaseous NH_3 at 220°C . These methods are widely applicable to the transformation of various triglycerides (C_4 – C_{18} skeletons) into the corresponding amines, amides, and nitriles.

Source: <https://doi.org/10.1002/cssc.201900365> [*ChemSusChem*, **2019**, 12, 3115 – 3125]

Acetalization of glycerol with ketones and aldehydes catalyzed by high silica $\text{H}\beta$ zeolite

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

In this work, proton-exchanged *BEA zeolite with a high Si/Al ratio of 75 ($\text{H}\beta$ -75), was demonstrated as an effective catalyst for the acetalization of glycerol with carbonyl compounds. This catalyst system was applicable to various substrates and reusable for at least 4 times with slight decrease in activity. The turnover frequency, based on acid site concentration, increased as a function of $\text{H}\beta$ Si/Al ratio, indicating the importance of the zeolite hydrophobic surface properties. The origin of the high efficiency exhibited by $\text{H}\beta$ -75 is quantitatively discussed based on kinetic studies, hydrophobicity, and acid site concentration.

Source: <https://doi.org/10.1016/j.mcat.2019.110608> [*Molecular Catalysis* 479 (2019) 110608]

Direct Phenolysis Reactions of Unactivated Amides into Phenolic Esters Promoted by a Heterogeneous CeO_2 Catalyst

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

The direct catalytic esterification of amides that leads to the construction of C–O bonds through the cleavage of amide C–N bonds is a highly attractive strategy in organic synthesis. While aliphatic and aromatic alcohols can be readily used for the alcoholysis of activated and unactivated amides, the introduction of phenols is more challenging due to their lower

nucleophilicity in the phenolysis of unactivated amides. Herein, we demonstrate that phenols can be used for the phenolysis of unactivated amides into the corresponding phenolic esters using a simple heterogeneous catalytic system based on CeO₂ under additive-free reaction conditions. The method tolerates a broad variety of functional groups (>50 examples) in the substrates. Results of kinetic studies afforded mechanistic insights into the principles governing this reaction, suggesting that the cooperative effects of the acid–base functions of catalysts would be of paramount importance for the efficient progression of the C–N bond breaking process, and consequently, CeO₂ showed the best catalytic performance among the catalysts explored.

Source: <https://doi.org/10.1002/chem.201901446> [Chem. Eur. J. 2019, 25, 10594 – 10605]

High-silica H β zeolite catalyzed methanolysis of triglycerides to form fatty acid methyl esters (FAMEs)

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

Transesterification of biomass-derived triglycerides with methanol (methanolysis of triglycerides) is a promising method for the industrial production of the biodiesel fuel, fatty acid methyl esters (FAMEs). Herein, we present a simple heterogeneous catalytic method for the selective transformation of triglycerides into FAMEs. For the methanolysis of trilaurin under reflux of methanol, a commercially available high-silica H β zeolite (H β -75, Si/Al = 75) showed a higher yield of methyl laurate than other zeolite catalysts, metal oxides, and conventional heterogeneous and homogeneous catalysts. Under the optimized conditions, the method was widely applicable to the transformation of various triglycerides (C₄–C₁₈ frames) into the corresponding FAMEs (yields of 87–93%). The catalyst was furthermore reusable. Quantitative relationships between acidity, hydrophobicity, and reaction rates versus Si/Al ratio of H β zeolite catalysts show that a low affinity to glycerol, which arises from the hydrophobicity of the high-silica zeolites, is an important factor for controlling the catalytic activity.

Source: <https://doi.org/10.1016/j.fuproc.2019.106204> [Fuel Processing Technology, 2020, 197, 106204]

Highly β -Selective Glycosylation Reactions for the Synthesis of ω -Functionalized Alkyl β -Maltoside as a Co-crystallizing Detergent

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

Methods have been reported for the preparation of ω -functionalized alkyl maltoside and glycoside detergents via a simple and inexpensive synthetic route. The key step was stannic chloride-mediated glycosylation of long-chain alcohols or thiols with maltose octaacetate at 0 or -10°C , respectively, within a very short time (isolated yield 17–44%), which provided more than 98% β -selectivity.

Source: [*Russian Journal of Organic Chemistry*, 2020, Vol. 56, No. 10, pp. 1806–1814]

Hydrolysis of amides to carboxylic acids catalyzed by Nb_2O_5

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

Hydrolysis of amides to carboxylic acids is an industrially important reaction but is challenging due to the difficulty of cleaving the resonance stabilized amidic C–N bond. Twenty-three heterogeneous and homogenous catalysts were examined in the hydrolysis of acetamide. Results showed that Nb_2O_5 was the most effective heterogeneous catalyst with the greatest yield of acetic acid. A series of Nb_2O_5 catalysts calcined at various temperatures were characterized and tested in the hydrolysis of acetamide to determine the effects of crystal phase and surface properties of Nb_2O_5 on catalytic performance. The high catalytic performance observed was attributed mainly to the facile activation of the carbonyl bond by Lewis acid sites that function even in the presence of basic inhibitors (NH_3 and H_2O). The catalytic studies showed the synthetic advantages of the present method, such as simple operation, catalyst recyclability, additive free, solvent free, and wide substrate scope (>40 examples; up to 95% isolated yield).

Source: <https://doi.org/10.1039/D0CY02230F> [*Catal. Sci. Technol.*, 2021, 11, 1949-1960]

Pd Nanoparticles-Loaded Vinyl Polymer Gels: Preparation, Structure and Catalysis

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

Four vinyl polymer gels (VPGs) were synthesized by free radical polymerization of divinylbenzene, ethane-1,2-diyl dimethacrylate, and copolymerization of divinylbenzene with styrene, and ethane-1,2-diyl dimethacrylate with methyl methacrylate, as supports for palladium nanoparticles. VPGs obtained from divinylbenzene and from divinylbenzene with styrene had

spherical shapes while those obtained from ethane-1,2-diyl dimethacrylate and from ethane-1,2-diyl dimethacrylate with methyl methacrylate did not have any specific shapes. Pd(OAc)₂ was impregnated onto VPGs and reduced to form Pd⁰ nanoparticles within VPGs. The structures of Pd⁰-loaded VPGs were analyzed by XRD, TEM, and nitrogen gas adsorption. Pd⁰-loaded VPGs had nanocrystals of Pd⁰ within and on the surface of the polymeric supports. Pd⁰/VPGs efficiently catalyzed the oxidation/disproportionation of benzyl alcohol into benzaldehyde/toluene, where activity and selectivity between benzaldehyde and toluene varied, depending on the structure of VPG and the weight percentage loading of Pd⁰. The catalysts were stable and Pd leaching to liquid phase did not occur. The catalysts were separated and reused for five times without any significant decrease in the catalytic activity.

Source: <https://doi.org/10.3390/catal11010137>; *Catalysts* **2021**, *11*(1), 137