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PREFACE

Bulletin of Chemical Reaction Engineering & Catalysis (ISSN 1978-2993) is an international journal published by Department of Chemical Engineering, Diponegoro University, jointly with *Masyarakat Katalis Indonesia* - Indonesian Catalyst Society (MKICS). In Scopus coverage years 2011-2014, this journal reached the highest impact factor (by journalmetrics.com) in Indonesia and world ranked 39th or Q4 level in Scimago Catalysis category and world ranked 24th or Q3 level in Scimago Process and Chemistry Technology category. In addition, this journal has also good impact factor in Scimago Journal Ranking and Journal Metrics with SJR = 0.251; SNIP = 0.848; and IPP = 0.719 for coverage years 2011-2014. Thank you for great contribution to all respectful Authors, Peer-reviewers, and Editors.

This journal is dedicated as a media for communicating all research activities in chemical reaction engineering and catalysis fields, and disseminating the novel technology and news related to chemical reaction engineering, catalyst engineering and fundamentals, bioreactor engineering, membrane reactor, and catalytic reactor engineering.

This issue (BCREC, Volume 10, Issue 2, Year 2015) has published 12 articles with various topics in catalysis materials, kinetics studies, and chemical reactor modeling and optimization. This issue was authored and co-authored by 49 authors from 6 countries (Indonesia, India, Iran, Taiwan, Malaysia, and Egypt).

In the first article, a research article about the vulcanization kinetics of ethylene-propylene diene monomer (EPDM) rubber thermal insulation was studied by Fathurrohman *et al.* [1] using rheometer under isothermal condition at different temperatures. This study suggested that the optimum curing time was predicted from autocatalytic model and the kinetic parameters were obtained by using the relationship between degree of conversion, cure temperature, and cure time. The predictions of cure time provided information on the actual curing characteristic of EPDM thermal insulation. The mechanical properties of EPDM thermal insulation with different vulcanization temperatures showed the same hardness, tensile strength and modulus at 300%, except at temperature 70 °C, while the elongation at breaking point decreased with the increasing temperature of vulcanization.

Modeling and optimization of chemical reactor were studied by Altway *et al.* [2] and Sadighi *et al.* [3] in the second and twelfth articles in this issue. The studies were focused on modeling and simulation of CO_2 absorption into promoted aqueous potassium carbonate solution in industrial scale packed column as well as optimizing an industrial scale naphtha catalytic reforming plant using a hybrid artificial neural network and genetic algorithm technique, respectively. In the first study, from the simulation prediction results, %CO_2 removal of 95.55% was obtained at the absorber pressure of 33 atm with a lean flow rate of 32,0867 kg/h, temperature of 343 K, as well as semi lean flow rate of 2,514,122 kg/h, temperature of 385. In the second study, the octane barrel level (OCB) of the plant was maximized by manipulating the inlet temperature of reactors, and hydrogen to hydrocarbon molar ratio whilst all process limitations are taken into account.

In third article, Babhare *et al.* [4] highlighted the applications of different mixed metal oxides exploring the capture of CO_2 and convert of CO_2 to syn-gas. The several samples of the mixed metal oxides were prepared by the sol-gel, solid-solid fusion, precipitation, molten salt and template methods in order to investigate the performance of mixed mtal oxides to the CO_2 applications..

Another article about time, temperature and amount of distilled water effects on the purity and yield of bis(2-hydroxyethyl) terephthalate (BHET) purification system was reported by Goh *et al.* [5]. In this study, it was found that the optimum conditions of 3 hours crystallization time, 2 °C crystallization temperature and 5:1 mass ratio of distilled water used to glycolize solid gave the highest yield and purity of the crystallization process.

The kinetics modeling of decoking of Pacol process dehydrogenation catalyst was studied by Toghyani *et al*. [6] in a pilot scale fixed bed reactor experimentally. The Pt/γ-Al_2O_3 catalyst life time was limited by the formation of coke on the external and internal surfaces of catalyst in dehydrogenation reactors. The effects of temperature, oxygen concentration and other operating conditions on decoking process were investigated. A kinetic model was developed to describe the decoking of mentioned catalyst.

Another article in this issue was focused on studying the effect of reaction time and NaOH catalyst in transesterification of coconut oil enhanced by microwave and to obtain a biodiesel by Suryanto *et al*. [7]. The reaction was conducted in batch reactor equipped by microwave. Results showed that the microwave could be employed as an energy source and was able to accelerate the transesterification process to produce biodiesel using NaOH catalyst. The biodiesel yields increased with increasing microwave power. The highest yield of biodiesel was obtained 97.37% with reaction conditions set at 0.2 wt.% catalyst, a reaction time of 2 min, molar ratio of methanol to oil 1:9 and microwave power of 400 watt.

Next article in this issue is about synthesis, characterization and catalytic activity of Cu/Cu_2O nanoparticles prepared in aqueous medium by Badawy *et al*. [8]. The copper/copper oxide (Cu/Cu_2O) nanoparticles were synthesized by modified chemical reduction method in an aqueous medium using hydrazine as reducing agent and copper sulfate pentahydrate as precursor. The results showed that the second-order equation provides the best correlation for the catalytic decomposition of H_2O_2 on Cu/Cu_2O. The catalytic activity of hydrogen peroxide by Cu/Cu_2O is less than the catalytic activity of MnO_2 due to the presence of copper metal Cu with cuprous oxide Cu_2O.

Article focused on thermal behavior and hydrogen production of methanol autothermal reforming performed using oxygen enrichment and Cu/ZnO/Al_2O_3/Cr_2O_3/CeO_2 catalyst was highlighted by Lesmana and Wu [9]. A fixed-bed reactor designed for the autothermal reforming (ATR) of methanol under adiabatic conditions was constructed to experimentally determine the profile of temperature and catalyst activity generated using the Cu/ZnO/Al_2O_3/Cr_2O_3/CeO_2 catalyst. The effect of oxygen enrichment in this experiment was investigated, and the experimental results showed that an increase in oxygen concentration correlated with an increase in the temperature of the catalytic bed; by contrast, this increase in oxygen concentration resulted in a reduction of the startup time of the catalyst.

A highly active catalyst H_4[α-$SiW_{12}O_{40}$]/Zr based polyoxometalete Keggin type prepared by wet impregnation method and characterized by FTIR spectroscopy, X-ray diffractometer, surface textural property by SEM, and analysis of porosity by BET method was studied by Lesbani *et al*. [10] H_4[α-$SiW_{12}O_{40}$]/Zr was successfully synthesized and showed uniform properties with block solid structure which was applied as heterogeneous stable catalyst for oxidative desulfurization of benzothiophene under simple and mild condition using H_2O_2 as oxidant. Facile conversion of benzothiophene to sulfone by using heterogeneus H_4[α-$SiW_{12}O_{40}$]/Zr catalyst up to 99% was observed to show the active catalytically. Keggin H_4[α-$SiW_{12}O_{40}$]/Zr cage structure after reaction was different from fresh catalyst which was indicated by the instability of H_4[α-$SiW_{12}O_{40}$]/Zr under reaction condition.

Next article in this issue was written by Rodiansono *et al*. [11] focusing on catalytic hydrogenation of levulinic acid in water into γ-valerolactone over bulk structure of inexpensive intermetallic Ni-Sn alloy catalysts. Intermetallics Ni-Sn that contain Ni_3Sn, Ni_3Sn_2, and Ni_3Sn_4 alloy phases are known to be effective heterogeneous catalysts for levulinic acid hydrogenation giving very excellence γ-valerolactone yield of >99% at 433 K, initial H_2 pressure of 4.0 MPa within 6 h. The effective hydrogenation was obtained in H_2O without the formation of by-product. Intermetallic Ni-Sn(1.5) that contains Ni_3Sn_2 alloy species demonstrated very stable and reusable catalyst without any significant loss of its selectivity.

The performance of toluene methylation reaction was studied by Ghosal *et al*. [12] over H-ZSM-5 catalyst modified with La, Ce and Nb at different percentage loading. In this research, 10% metal

loading produced the best performance in the reaction in terms of toluene conversion. The catalyst was coated on silicon carbide foam support which showed better conversion than the pelleted catalyst. Again, among the treated and untreated H-ZSM-5, the La-ZSM-5 catalyst is chosen for the reaction for its highest selectivity towards xylene, as the main product. Kinetic study was done on La-ZSM-5 with 10% loading. Langmuir-Hinshelwood kinetic model with surface reaction as rate controlling step was selected as the rate equation.

Currently, BCREC journal is an open access international journal. Therefore, readers can read and download any full-text articles for free of charge. Official website address of BCREC journal is: *http://bcrec.undip.ac.id*. Editor would like to appreciate and to call for papers all researchers, academicians, industrial practitioners focused on chemical reaction engineering and catalysis to contribute to this international journal.

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