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Special Issue of 5th International Conference on Recent Innovations of Chemistry and Chemical Engineering (ICCCE2017)

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1. Editorial

Recent studies and achievements have demonstrated that chemistry discipline is flourishing as an interdisciplinary science and the associated findings may have numerous applications in various fields. For instance, in today's voracious energy consuming societies, a need for renewable energy is incontrovertible, since the use of carbon-based fossil energy imposes a bulk amount of pollutions on the environment and water resources, for which some chemical compounds, like TiO_2-SiO_2 Mixed Oxide can be used as removal technique [1], as a result solar and marine energy needs political and/or economic support to be developed at all micro and macro levels [2]. Moreover, chemistry is called interdisciplinary since its latest achievements on Nanotechnology has been used, for instance in fabrication of more durable self-consolidating concrete in terms of rheological and mechanical properties, in which nanomaterials such as nanosilica, nanoclay, TiO_2, Fe_2O_3, CuO, ZnO_2, Al_2O_3, and ZrO_2 nanoparticles are utilized [3]. To this end, the topics of ICCCE series are composed in a manner that authors and scholars of other disciplines were able to submit their papers, particularly whose research results and findings had a close relevance with the conference topics. In what follows the review consisted of objectives, methods and findings of these fiver papers accepted for publication in the journal is presented. This special issue of Biointerface Research in Applied Chemistry encompasses a collection of five papers, as well as one editorial article.

To date, ICCCE series, International Conferences on Recent Innovations of Chemistry and Chemical Engineering have been held annually with a main concentration on providing a platform for the presentation of the quality research and studies conducted by researchers. The most recent edition of the conference, entitled "5th International Conference on Recent Innovations of Chemistry and Chemical Engineering" was held in Tehran, Iran, which received over than 200 submissions on various fields of chemistry science, among which five papers were opted by the editors for possible publication in the special issue. These five papers were peer reviewed by Biointerface Research in Applied Chemistry based on two positive comments by the reviewers per paper and the relevance to journal scope, finally after applying the required amendments, the revised version of the articles was eligible to be published. We would like to express our sincere gratitude to the authors for their contribution in organizing this collection. These five papers deal with topics, including drying process, removal of remove sulfate pollutant, carbon dioxide pollution, separation of immiscible liquids and light and ultra-light drilling fluid.

The special issue commences with "Experimental Study of Heat and Mass Transfer in a Fixed-Bed Dryer". In this paper, authors' objective was to develop a fixed-bed dryer and they utilized the dryer to dry silica gel particles. The heat required for drying silica gel particles was supplied by hot air. An empirical-mathematical relation was obtained for estimating the mass transfer coefficient, as well as an empirical-mathematical relation was considered for predicting the heat transfer coefficient in fixed-bed drying. Experimental results showed that higher silica gel moisture content leads to a greater drying rate. The obtained results demonstrated that any increase in the flow rate leads to increase in the mass and heat transfer coefficients, while the diffusivity of water in air remained almost constant. Increased temperature led to increase in the mass and heat transfer coefficients, as well as the diffusivity. A dryer that was compatible with both fixed and fluidized beds which was devised and fabricated. The adsorbent is placed inside the device and the hot air generated by a blower goes through a heater and dries the adsorbent through convection heat transfer.

In "The effect of power plant wastewater concentration on microalgae performance to remove sulfate pollutant: A batch study", Mohammadi, Mowla, Esmaeilzadeh and Ghasemi have focused on removal of sulfate ions from wastewaters, while their main purpose was to evaluate the microalgae performance in sulfate removal under various concentrations of power plant wastewater. Hence, the batch liquid culture was used. They prepared the wastewater of Fars combined cycle power plant in four volumetric concentrations (25%, 50%, 75%, and 100%) and applied as a microalgae culture medium. Oocystis sp. was inoculated in the 10-volumetric percentage of the culture system. The amount of sulfate removal was scrutinized at certain times during a period of 21 days for different mediums. The results indicated that microalgae can remove sulfate at various concentrations of wastewater. Due to nutrient reduction, existing in the wastewater, decrease in the concentration did not have a significant impact on improving the microalgae performance to remove sulfate. Therefore, the application of the biological

method with microalgae is a promising option for removal of sulfate pollutant from power plant wastewater.

In the paper, entitled "Reduction in carbon dioxide emission with nano paint on building: A case study" authors have investigated the reduction of carbon dioxide in a residential building incorporating fossil fuels-based heating system. For Farahmand, Honarvar and Taheri, the effect of nano painted facade of building on reduction of the carbon dioxide emission is regarded as a novel view point to the nano paint. First, the historical data of the consumed gas for the years before painting and after painting are compared, afterwards, the CO_2 emissions related on the consumed gas for heating are calculated and compared. Finally, the results indicated the reduction in the amount of consumed gas and in the CO_2 emission after painting of façade with nano paint.

The authors of the paper, entitled "Comparison CFD Modeling of DROP-interface Coalescence and Experimental Results" have attempted to study the separation of two immiscible liquids (sodium hydroxide and dimethyl disulfide). The numerical simulations were used for studying the coalescence of dimethyl disulfide with mother phase at interface. A cylindrical glass device with an inner diameter of 8 cm and height of 40 cm was designed. The comparison between experimental results and the results of modeling were juxtaposed and desirable agreement between them was verified and also the effect of several parameters including of drop diameter, continuous phase density regulated by temperature, and sodium hydroxide concentration, continuous phase to dispersed phase viscosity ratio on coalescence time were studied.

The main objective of the paper, entitled "Design of light and ultra-light drilling fluid by employing a low-cost environmentally friendly new additive" was to introduce a new environmentally friendly additive for creating 50 pcf drilling fluid without any special equipment. The findings showed that this new additive is able to make ultra-light fluid with 40 pcf and high stability via combining with the Sodium Dodecyl Sulfate (SDS) foaming agent. With regard to the results, the 40 pcf ultra-light fluid is easily transformed to 85 Pcf fluid by adding a defoamer and calcium carbonate. Regarding field experiences, the importance of this point is when there is an emergency requirement for rapid fluid weight increase during drilling operations and this can be accomplished easily with the designed fluid.

With regard to the findings of the aforementioned papers, it was observed that the ICCCE participants have focused on the most useful aspects of chemistry, whose findings may contribute to the literature on the topics. We hope that this special issue can act as an inspiration for the prospective researchers and scholars to extend the scope of the discussed papers and the readers enjoy the present special issue.

5. REFERENCES

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