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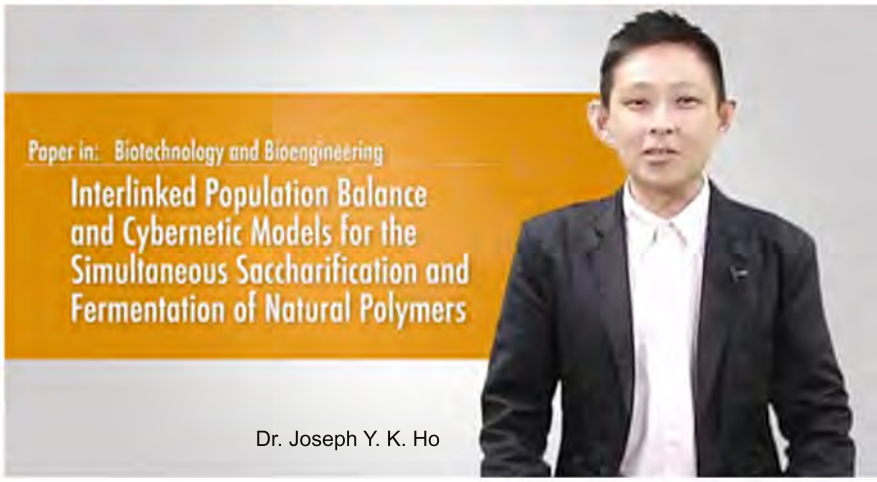
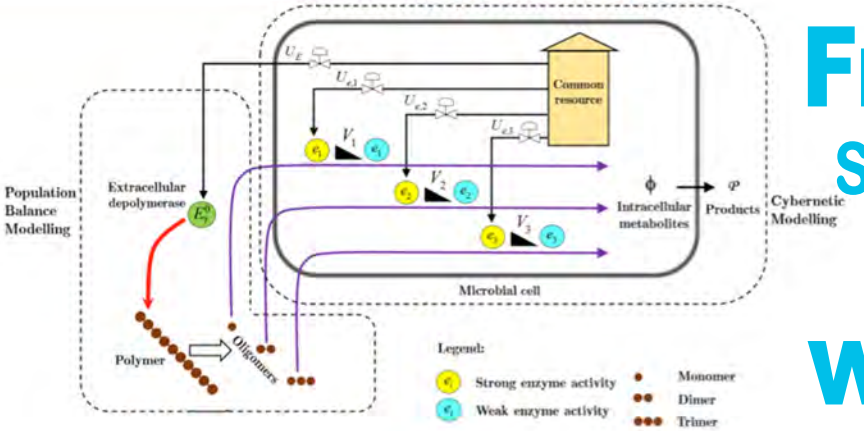


From starch to bioethanol: deciphering what happens



Graphical illustration of the new framework reproduced from Ho et al. (2015)

Production of bioethanol from starch or plant materials looks simple: add some microbes to a slurry of such plant materials in a pot, and out comes ethanol. In reality, this process is anything but simple. A string of events must occur in a concerted manner. The microbes have to first realize that easy food is absent, then secrete enzymes to cut the long chains of molecules to produce smaller sugars, detect the presence of such sugars, select which sugar to consume, slow down the enzyme secretion, produce other internal enzymes to consume the sugars, before bioethanol finally emerges.

For industrial production, it is vital to be able to predict what happens in each of these stages. Such insights help to optimize the production, for example in producing the maximum amount of bioethanol in the shortest time.

Much effort had been devoted to modelling this one-pot process, especially in the cutting of long chains and in the production of ethanol. But a comprehensive model that combines the whole string of events has yet to surface.

Researchers at the Department of Chemical Engineering and a collaborator from the National Chemical Laboratory of India (at Pune) had recently proposed a fresh framework to fill this gap. By carefully examining the underlying mathematical principles in the Population Balance Modelling (PBM) and the Cybernetic Modelling (CM) approaches, the team had successfully laid out the mathematical link for both components to be implemented in unison. Such a framework has the capability to comprehensively describe the whole string of events alluded to above. Results showed that the framework was able to effectively capture the complexities in the production of bioethanol from starch beyond the capability of existing approaches.

The team's effort was recognized internationally when their work was published in the renowned Biotechnology and Bioengineering journal, a first for the University of Malaya. The video highlights for the paper is available at https://www.youtube.com/user/WileyVideoAbstracts (Direct link at https://youtu.be/dAi-ew7jZjk).

MILESTONE@UM newsletter

UNIVERSITY OF MALAYA

Volume 3/2015

For further information contact:

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Redefining Surface Protection: Polymeric Anticorrosion Coatings

(Best Award for Poster Presentation)

Paints, synonymously known as surface coatings, have more than just meet the eyes. The usage of these surface protection agents is generally for aesthetic value and protection against stress and wide variety of surrounding environmental conditions. In this regard, the cutting-edge achievements in the coating industries would be possible only via massive laboratory research work along with vision and out of the box mentality. Our research group in University of Malaya has worked in developing new organic coatings that combine the superior corrosion protection, thermal stability and the process ability. One of the most pronounced achievements was related to the successful development of organic - inorganic hybrid coating systems which represent the novel employment of the organic polymeric functionality along with the durability of the inorganic fillers and additives

One goal of this research group was to achieve a full understanding of the polymeric materials when they utilized as a barrier layer in order to prevent the degradation of the coated surface by corrosion in terms of electrochemical, thermal, and mechanical properties of the final products. Acrylic, epoxy, silicone and polyester are some of the main materials that have been used and investigated. As the research grows over time, new approaches and branches started to gain some attention as the employment of the nanotechnology with its countless advantages i n the development of nanocomposite coatings. Embedding different types of nano-sized fillers within the developed polymeric matrix gives the ability to cross the limitation of normal coating systems and gain new features like hydrophobic surfaces or self-healing ability without surfing other needed properties. Our coating has achieved better contact angle of more than 130o which is very close to super hydrophobic nature. We are striving for that. This will lead to the development of self-cleaning coatings. This type of coatings will give dust free surfaces which will give clean environment.

GRAPHICS

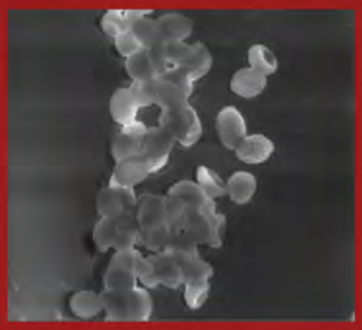

Figure 1(a)

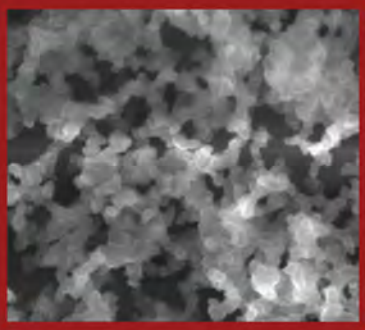

Figure 1(b)

Figure 1 : Distribution of nanoparticles within the polymeric matrix Figure 1(a) before and Figure 1(b) after of ultrasonication process

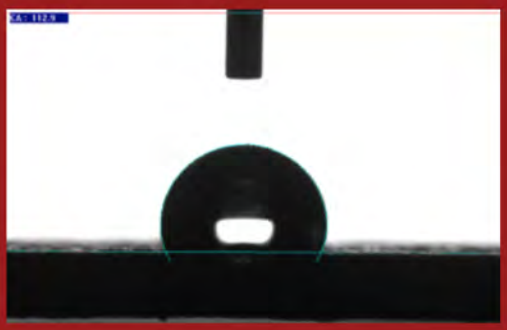

Figure 2: Maximum contact angle more than 130o achieved by the developed coatings

AWARD WINNING BY UNDERGRADUATES

HARVARD BUSINESS SCHOOL ALUMNI CLUB OF MALAYSIA (HBSACM) GOLD MEDAL AWARD FOR BEST GRADUATE IN BACHELOR OF BUSINESS ADMINISTRATION

Harvard Business School Alumni Club of Malaysia (HBSACM) was established since 1977 and at present has more than 200 HBSACM alumni member. In achieving its objective, HBSACM recognizes excellent business students by awarding Gold Medals for the best University graduates in MBA and BBA studies through its foundation.

In 2015, the HBSACM Gold Medal Award for Best Student in BBA is conferred to Mr. Firmansyah Shidiq Wardhana, from Faculty of Business & Accountancy, University of Malaya. Mr. Firmansyah has registered as the Faculty student in 2012 on a scholarship funded by CIMB Niaga and CIMB Foundations Scholarship. His other outstanding achievements are:

1. Best Team Award Winner for ASEAN Green Business & Accounting Research Challenge
2. 1st place Best Team Award for CIMB ASEAN Young Leaders Summit
3. Best International Undergraduate Campus Activist Award
4. Best Extracurricular and Non-Academic Award for CIMB Scholars

HARVARD
BUSINESS SCHOOL ALUMNI CLUB OF MALAYSIA

12th October 2015

En Firmansyah Shidiq Wardhana,
Block A7, 12th Residential College,
University of Malaya,
Kuala Lumpur

Dear En Firmansyah,

GOLD MEDAL AWARD 2015 - BBA

Greetings from Harvard Business School Alumni Club of Malaysia!

Congratulations!

I am pleased to inform you that you have been selected as the recipient of the Harvard Business School Alumni Club of Malaysia (HBSACM) Gold Medal Award for best graduate in Bachelor of Business Administration. The Award carries a prize money of RM5,000, a Certificate and a Plaque.

You will be invited to the HBSACM 38th Anniversary Dinner in Kuala Lumpur in November to receive the Award.

Thank you.

Yours Sincerely

Hj. Abd Aziz Abd Manan
Hon.Secretary

Patron
YABhg Tun Dr. Mahathir Mohamad
D.K.(Johor), DK(Kelantan), D.K.(Selangor), DK(Kedah), D.K.(Perlis), D.K.N.S., D.U.K., S.M.N., S.P.M.J., S.P.M.S., S.P.C.M., S.S.D.K, S.S.A.P., S.S.M.T., D.U.P.N., S.P.D.K, S.P.N.S., D.U.N.M., S.B.S (Sarawak), D.P., S.U.M.W., P.I.S.

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AWARD WINNING BY UNDERGRADUATES

UM STUDENTS FROM SPE CHAPTER TEAM WON 1st RUNNER UP OIL RIG COMPETITON 2015

Universiti Malaya's team from SPE Chapter has won 1st runner up in an oil rig competition in conjunction with the Oil and Gas Week (OGW) 2015 held by Oil and Gas Engineering Faculty, University Teknologi Mara on 29th of October. University of Malaya was represented by 5 enthusiastic chemical engineering students. They are Tham Kuang Keong, Phim Eran, Tan Soon Teck, Snowie Khor, Kee Choon Kai. Despite from a non-petroleum engineering background, the team successfully constructed a reliable miniature model of jack-up oil rig that can withstand a specific load.

Many local and international universities were participated in the event. From our neighbouring countries, the participants are the Institut Teknologi Sepuluh November, Universitas Indonesia, Universitas Diponegoro, Universitas Islam Riau from Indonesia, Batangas University and Palawan State University from the Philippines. From Malaysia, they are UiTM, Universiti Teknologi Petronas and Universiti Teknologi Mara.

The participants from various universities except the UM team are petroleum engineering students who have learnt and exposed to oil rig design before. This makes the award even more "prestigious" to the SPE-UM team as the only team represented by non-petroleum engineering students. This further demonstrates the creativity and competitiveness possessed by UM students.

The team would like to thank the office of TNC Academic to provide financial support for the competition and also the staff of engineering faculty for supervise.