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**TECHNICAL PROGRAMME  
&  
ABSTRACTS**

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**Technical Programme & Abstracts**

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# ABSTRACTS

## ORAL PRESENTATIONS

PEAO7\_ENS\_2

### **The Recent Development on Utilizing Industrial Waste Towards Carbon Dioxide Sequestration by Using Mineral Carbonation Technology**

Siti Ida Farida Abd Razak (Universiti Teknologi MARA, Malaysia); Ruzitah Mohd Salleh (Lecturer, Universiti Teknologi Mara, Shah Alam, Malaysia); Sharifah Aishah Syed Abd Kadir (Universiti Teknologi MARA, Malaysia)

There is mounting concern that carbon dioxide (CO<sub>2</sub>) emissions are contributing to global climate change. Developing technologies to mitigate the problem are vital towards nature and nation. One very promising approach to reduce CO<sub>2</sub> emissions is CO<sub>2</sub> fixation through mineral carbonation. This is a technology which the suitable minerals undergo the carbonation process and produce the solid carbonates that permanently sequesters the CO<sub>2</sub>. An extensive works have been done by using mineral ores as feedstock. Current efforts done by worldwide researchers by utilizing the industrial wastes as alternative to those mineral ores have been widely reported. This paper discussed the development of CO<sub>2</sub> sequestration by using mineral carbonation process focusing on various industrial wastes as feedstock.

PEAO7\_ENS\_3

### **SWSPRO-1: Sustainable Tools for Scheduled Waste Generators in Malaysia**

Shahnor Mohammad (Universiti Teknologi MARA, Malaysia); Zulkifli Abdul Rashid (University Technology MARA Malaysia, Malaysia); Ku Halim Ku Hamid (Universiti Teknologi MARA, Malaysia)

Malaysia nowadays is a developing country that becoming industrialized nation by the year of 2020. Accordingly, to rapid growth of industry, the amounts of scheduled wastes generated also increased and lead our country to be more alert about this problem. The Department of Environment 7 years ago has already started an electronic reporting system called E-SWIS (Electronic Scheduled Waste Information System) and E-Consign (Electronic Consignment) which involved less paperwork and quicker tracking of waste movements, but its effectiveness is unproven. The system failed to discern and comprehend the material in-flow and out-flow of such complex successive scheduled wastes generators, transporters, recoveries and recycles, within the boundary system (country, unit operation, facilities). The lack of complete historical records of quantity and quality has resulted in a situation that makes the long-term system planning and/or short-term expansion programs intangible. A smart system, called SWSPRO-1 was developed to overcome the problems. The main goal of SWSPRO-1 applications are to plan the scheduled wastes management for the waste generators, policy makers, and environmental consultant, making prediction regarding the amount of scheduled waste categories and estimated cost required for disposing their wastes, and promoting waste minimization and sustainability. Besides, this application will help decision makers to identify the new and old scheduled wastes code, description for each code and determine status of e-waste. The software has highly potentially to be commercialized to Malaysia government e.g. DOE, DOSH,

NIOSH, NRE, MOSTI, environmental consultants and industries.

PEAO7\_ENS\_4

### **Control of NO<sub>x</sub> and Soot Emissions From Biodiesel Fuelled Engine Using EGR**

Mohamed Gomaa (University Tun Hussien Onn Malaysia (UTHM), Malaysia); Ahmad Alimin (Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia); kamarul Azhar Kamarudin (UTHM, Malaysia)

Studies show that the exhaust gas recirculation (EGR) has a trade-off between reduction in nitrogen oxides (NO<sub>x</sub>) emission, and increase in soot and carbon monoxide (CO), and hydrocarbon (HC) emissions. The aim of the present work is to investigate the effect of EGR on a compression ignition engine fuelled with blended Jatropha biodiesel in order to reduce NO<sub>x</sub> and soot emissions. A 4-cylinder, water-cooled, turbocharged, indirect injection diesel engine was used for the experiments. Exhaust emissions were recorded and engine performance parameters were also evaluated. The results showed that JB30 with 15% EGR rate effectively reduced NO<sub>x</sub> (37%) and soot (26.5%) emissions compared to diesel fuel without EGR.

PEAO7\_ENS\_5

### **Separation and Purification of Cellulase From Fermentation Broth of Sewage Sludge**

Muna Tasnim Bt Mukhtaruddin (IIUM, Malaysia); Md. Zahangir Alam Alam (International Islamic university malaysia, Malaysia); Hamzah Mohd hamzah (international Islamic University Malaysia, Malaysia)

Abstract-In recent years, growing attention has been paid to the conversion of biomass into bioethanol which is considered the cleanest liquid fuel alternative to fossil fuels. One of the major applications of cellulase lies in the process of hydrolysis of cellulosic or lignocellulosic material to produce sugar which can be further fermented to produce ethanol. This study focuses on the purification of cellulases produced from fermentation broth of sewage sludge. In this study, crossflow filtration was used for the purification method using microfiltration (0.45 µm) and ultrafiltration (10 kD, 5 kD and 1 kD). The results revealed that ultrafiltration with membrane size of 1 kD gave the best result for purification of cellulase from fermentation broth of sewage sludge which increases the enzyme activity from 22 U/ml after microfiltration to 50 U/ml after 1 kD of ultrafiltration.