

Mechanical Engineering Researcher wins IChemE Energy Award 2017



Dr. Chua with his IChemE Energy Award 2017

In recognition of his research effort and contribution to Energy and Sustainability, Associate Professor Chua Kian Jon Ernest, from the Department of Mechanical Engineering, was conferred the 'IChemE Energy Award 2017' on 19th October 2017.

Dr. Chua and his team have devised a new approach that leads to the liberation of hydrogen and oxygen from waste-water in a remarkably energy efficient manner. It comprises a triangular hybrid set-up comprising electrolysis, photocatalysis and photovoltaic cells. The implementation of such a hybrid system increases not only the hydrogen and oxygen production rates but employs the least energy, thereby making the method a truly renewable and sustainable one.

The oxygen and hydrogen produced are harvested and applied to evolve an advanced air treatment system (ATS). The ATS comprises an ozone generation system, generated from the harvested oxygen, is capable of achieving a dualistic function of air treatment and cleaning of chilled-water heat exchanger in air-conditioning systems. The entire ATS is highly sustainable since it employs solar irradiation, PV panels and rain-water to produce oxygen which converts to ozone for treating pollutants (such as VOC, formaldehydes, benzene, radon, asbestos) while enriching the supply air with higher oxygen content. In addition, the harvested hydrogen may be employed to generate electricity via fuel cells in order to operate blowers and controlled valves of the ATS.

In sum, an innovative and sustainable energy system has been engineered. It is one that produces hydrogen and oxygen in a highly efficient manner while utilizing these gases to supply power to air conditioning equipment and to purify indoor air pollutants.