

Posters from Recent Conferences

These articles were selected by Shimadzu. Relating to new energy, they derive from application notes and technical reports. They feature a variety of instruments and cutting-edge technologies. Please obtain the articles of your interest through the links on the titles.



Selection 1 Artificial Photosynthesis

QYM-01 Photoreaction Quantum Yield Evaluation System

The QYM-01 photoreaction quantum yield evaluation system permits accurate and easy quantitation measurements of absorbed photons when excitation light is irradiated onto a sample. The QYM-01 is the ideal system for in situ measurement of photochemical reactions and internal quantum yield evaluation of homogeneous photocatalysts.



Selection 2 Artificial Photosynthesis

High-Sensitivity Analysis of Formic Acid Using GC-BID in Artificial Photosynthesis Research

Artificial photosynthesis refers to a technique of creating high-energy materials using photocatalysis and solar energy, and is expected to play a role in the development of next-generation renewable energy. This Application News introduces an example in which the GC-BID is used for analysis of formic acid in an actual sample consisting of the solvent N,N-dimethylacetamide, used in the research of artificial photosynthesis.



Selection 3 Biomass

Analysis of Biomass Using Organic Acid Analysis System

Industrial production of bioethanol from biomass resources involves a process in which cellulose and hemicellulose in the biomass are decomposed using diastatic enzymes to be converted to monosaccharides such as glucose or xylose, which are then converted to ethanol by the action of yeast. Here, we introduce an example of the simultaneous analysis of acetic acid, formic acid, furfural, and 5-hydroxymethyl furfural, typically present in the biomass, using a combination of an organic acid analysis system together with an ultraviolet-visible spectrophotometric detector.



Selection 4 Biomass

Analysis of Organic Acids in Culture Medium Using Post-Column pH Buffering Organic Acid Analysis System

The shift from an emphasis on fossil fuels in recent years has been emphasized with increasingly active research into the bioproduction and manufacture of new energy sources and chemical products. Here, we introduce an example of analysis of organic acids in a culture medium using post-column pH buffered electrical conductivity detection in combination with a dual column oven, a system that provides both improved separation and high-selectivity detection.



Selection 5 Biomass

Simple Quantitative Measurement of Nannochloropsis Micro Algae in Water Using Shimadzu UV Micro Algae Analysis System

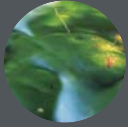
In studying micro algae, measurement of the daily growth (concentration) is important. Currently, this measurement is conducted by the dry weight method, in which the sample is filtered using filter paper, and then dried prior to weighing. Here, we introduce Shimadzu's newly developed UV micro algae analysis system which permits simple measurement of the micro algae concentration using a spectrophotometer.



Selection 6 Biomass

Monitoring of Algae Growth by TOC Measurement

This presents an example of a unique application in which the TOC-LCPH total organic carbon analyzer is used to track the growth process of microalgae by directly measuring, without conducting any pretreatment, the TOC content in a suspended culture of microalgae cells.



Selection 7 Biomass

Characterization of Algae by TOC Measurement

Microalgae can be used for the production of oil without competing with food production, and to a greater extent than other biofuels, its productivity per unit time and area is high, while arable land selection possibilities are great. Here, we introduce an example of a unique application in which the TOC-LCPH total organic carbon analyzer is used to characterize microalgae by directly measuring, without conducting any pretreatment, the TOC content in a suspended culture of microalgae cells.



Selection 8 Biomass

Measurement of TOC and TN in Marine Water Algae Culture Solution

The culturing of microalgae in various types of non-edible biomass has received considerable attention in recent years. Here, we introduce an example of the simultaneous measurement of TOC and TN in seawater using the TOC and TN measurement system consisting of the TOC-LCPH total organic carbon analyzer for microalgal biomass measurement and the TNM-L unit for total nitrogen measurement.



Selection 9 Energy

Tracera (GC-BID) Solution

The Tracera GC System utilizes Barrier Discharge Ionization Detector technology coupled with a GC-2010 Plus capillary gas chromatograph to create a GC system that makes it possible to reveal trace components that are difficult to see by other GC detectors. Shown here are 12 examples of applications using Tracera in a variety of fields such as artificial photosynthesis, coal-based chemical synthesis, etc.



Selection 10 Fuel Cell

Trace Impurity Analysis of Hydrogen Fuel in Fuel Cell Vehicle-Related Fields

With the development of fuel cell technology for electricity generation using hydrogen as fuel, attention is turning to household fuel cell systems and fuel cell vehicles. Here we introduce an example of high-sensitivity analysis of carbon monoxide in hydrogen and simultaneous analysis of impurities in hydrogen using the Tracera high-sensitivity gas chromatograph equipped with a BID detector.



Selection 11 Fuel Cell

X-Ray CT Observation of Fuel Cell MEA

Fuel cells are devices that convert the energy obtained from an electrochemical reaction of hydrogen fuel directly into electrical energy. Because they are highly efficient and emit only water, fuel cells have attracted great interest due to their potential for contributing significantly to providing a solution for both energy and environmental concerns. This Application News bulletin provides an example of using an X-ray CT system for fuel cell observation.



Selection 12 Lithium-ion battery

X-Ray CT Observation of Lithium-Ion Battery Electrodes

Today, rechargeable lithium-ion batteries are widely used in a variety of fields and are available in a wide range of shapes, capacities, and applications. X-ray CT systems are able to non-destructively observe the internal structure of items, and can therefore be used to analyze defective batteries, evaluate changes in the internal structure of batteries during cycle testing, etc. This application demonstrates how the inspeXio SMX-100CT can be used for detailed observation of the electrode structure in rechargeable lithium-ion batteries.



Selection 13 Solar Cell

Measurement of Transmittance of Solar Battery Glass -Measurement of Transmittance of a Light Scattering Solid Sample-

When measuring a solid sample with strong light scattering properties, using a 60 mm diameter integrating sphere can result in a change in photometric values at wavelengths where the detector is changed. We introduce an example measurement of the transmittance of solar battery glass that is strongly light scattering, where the change in photometric values is prone to occur.



Selection 14 Chemiluminescence

Measuring Peroxyoxalate Chemiluminescence Using a Spectrofluorophotometer

Chemiluminescence based on using oxalate esters features high-emission efficiency and long emission time and provides illumination for long periods without any electricity. Consequently, it is used for recreational, fishing, and many other applications where it is commonly called glow sticks. The following describes the luminescent process of peroxyoxalate chemiluminescence and gives an example of using an RF-6000 spectrofluorophotometer to measure the emission spectra of glow sticks.