

## Introduction of the Keynote speaker



Izumi Kumakiri received her Ph.D. degree from the University of Tokyo, Japan. Then, she worked at two research institutes in Europe, CNRS-France and SINTEF-Norway, for more than 10 years in total. Then she moved to a national university, Yamaguchi University, in Japan in 2011. In Europe, she worked on several international and domestic projects in the fields of carbon capture and storage (CCS), water cleaning and bio-energy by applying nano-functional materials and membranes. At Yamaguchi University, she collaborates with Prof. Yamada, who gives a plenary lecture in this conference, and has been working on the downstream of bio-fuel production.

The worldwide energy demand is growing, but we cannot continue the fossil-fuel based economy no longer. Combustion of fossil-fuel has a huge impact on the climate change and a quick action is required. Therefore, we need to shift from the fossil-fuel based economy to a more sustainable one. Bio-fuel is one of the potential energy sources and Southeast Asian countries have large biomass sources. Fermentation, which Prof. Yamada and others are working on, is a promising rather simple conversion technology of biomass to bio-fuels. However, the concentration of e.g. alcohol after fermentation is very low, e.g. a few percent. For fuel applications, the dilute alcohol solution needs to be concentrated over 99%. The conventional process, distillation, is an energy-demanding process for the concentration. By replacing distillation with more energy-efficient separation process, the advantage of using bio-alcohol will be greater.

In this talk, a new separation and concentration technology, membrane separation, will be introduced. The recent development on micro-porous inorganic membranes, their unique properties and simple operation will be discussed.