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Abstract of the Presentation "Catalysts toward More Sustainable Chemical Synthesis"

In the last century, chemical industry made progress utilizing fossil resources for the synthesis of carbon-based chemicals now widely used in our daily life. Historically, coal and then oil played the major role as resources and in the recent years, natural gas has expanded its use as a cleaner hydrocarbon resource. As an alternative carbon source, renewable resources came to attract more and more attention. As unutilized bio-based resource, lignin is a fascinating material since currently its use is limited fuel for heat. Plastic waste also consists of carbon materials. Since such resources are complicated polymeric materials, degradation of the polymeric structure is indispensable for effective utilization of them. In the lecture, catalyst development for covalent bond cleavage will be discussed in relation to its potential application for polymer degradation. Carbon dioxide contains one carbon atom per a molecule and it can be also considered as a carbon source. Given that carbon dioxide is the most stable form of carbon under air, additional energy is necessary for its chemical transformation to other compounds. We use hydrocarbon as the energy source for polymer synthesis. Thus in the presentation, polymer synthesis from butadiene and carbon dioxide will be presented together with further chemical modification of the product polymers.

Prof. Dr. Kyoko Nozaki is a full professor at the University of Tokyo. She received her BSc degree in 1986 and her PhD in 1991 from Kyoto University under the guidance of Prof. Kiitiro Utimoto. Her research interest is focused on development of highly sophisticated molecular transition metal catalysts for polymer synthesis and organic synthesis. Prof. Nozaki is awarded with numerous honors, such as the L'Oréal-UNESCO For Women in Science Award (2021) and the GDCh August Wilhelm von Hofmann Lecture Award (2019). She received the Dr. Karl Wamsler Innovation Award in 2021 "in recognition of her ground-breaking work on utilizing carbon dioxide and sophisticated polymerization catalysis with organometallic complexes."