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The collection is devoted to important and perspective directions of modern catalysis: fundamentals of catalyst preparation and catalytic processes, promising catalytic processes and industrial implementation of catalytic processes.

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Editorial staff

O.V. Vodyankina, Doctor of sciences, Professor
T.S. Kharlamova, PhD., Associate professor
V.S. Malkov, PhD., Senior researcher

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Catalysis as the cornerstone of green chemistry

E.S. Lokteva^{1,2,3}

¹*Lomonosov Moscow State University, Moscow, Russia*

²*Committee on Chemical Research Applied to World Needs (CHEMRAWN) of IUPAC*

³*Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD) of IUPAC*

e.lokteva@rambler.ru

Green chemistry approach plays the key role in the technical aspect of the sustainable development. Only on this basement 17 UN Global Goals to Transfer Our World adopted in 2015 [1] can be realized. Nearly all of these goals relate to the development of chemistry, directly or indirectly, and cannot be achieved without the use of green chemistry approaches. Thus, green chemistry is the basement to meet the goals: 1 – no poverty, 2 – zero hunger, 3 – good health and well-being, 6 – clean water and sanitation, 7 – affordable and clean energy, 8 – decent work and economic growth, 9 – industry, innovations and infrastructure, 11 – sustainable cities and communities, 12 – responsible consumption and production, 13 – climate action.

Catalytic processes constitute the very essence of green chemistry. Their great variety, high selectivity and atom economy provide means to solve many technical problems faced by chemists on the path to the sustainable development.

This lecture will elucidate great possibilities provided by catalysis in the fields of energy production, biomass transformation to valuable chemicals, special chemicals production etc.

Some urgent topics of green chemistry from the perspective of catalysis will be briefly characterized, which relate to:

- the substitution of rare and precious elements with those which are common on Earth in catalysts compositions;
- the estimation and decrease of toxicity of the chemicals used for catalysts preparation, or as raw materials in catalytic processes under development;
- the life cycle analysis providing valuable instrument to compare competing catalytic processes in a reliable and convincing way;
- a comparison of end-of-pipe technologies and new production ways for minimization of wastes;
- the use of biologic objects as prototypes and raw-materials for catalysts preparation.

The set of examples demonstrating innovations in the fields listed above will be presented.

Special attention will be given in the lecture to the need in holistic approach to differentiate “green” and “not green” processes instead of attribution the processes as green on the base of the only one characteristic feature e.g. the use of ionic liquid or supercritical fluid as a solvent.

References

1. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

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