



SCO-Young Scientist Profile

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Details of research work carried out in S&T (

Nitrous oxide, also known as a ‘laughing gas’, recently gained a significant attention of the research community due to its’ highly negative environmental impact. It was demonstrated that emissions of this gas are the main reason of the destruction of the ozone layer and consequent dramatic climate changes. This fact made a chemistry of nitrous oxide a ‘hot’ topic of a modern science. Currently, industrial emissions of nitrous oxide are thermally destroyed in order to reduce its negative environmental impact. We believe that nitrous oxide is an underappreciated reagent, which could be efficiently employed for the synthesis of value-added products, and its decomposition is not the best way to utilize this by-product gas. In addition, nitrous oxide is a much ‘greener’ oxidant than the currently employed halogen or heavy metal derivatives.

Associated SCO-YSC Theme: Energy, chemistry, sustainability

Statement of Innovation Nitrous oxide emissions are the main reason of the Ozone layer destruction and undesirable Global climate changes. The majority of works on the chemistry of nitrous oxide deals with the methods of its decomposition and aim to reduce its anthropogenic emissions. We believe that the nitrous oxide is an underappreciated chemical raw material. The main reason which hampers utilization of nitrous oxide is its high kinetic inertness. Thus the search of efficient activators of nitrous oxide is highly desirable. Recently we discovered an unprecedented reaction of adduct formation between nitrous oxide and N-heterocyclic carbenes (J. Am. Chem. Soc. 2013, 135, 9486, Chemical Science 2019, 10, 5719, Angew. Chem. Int. Ed. 2012, 51, 232). Fixation of nitrous oxide allowed us to overcome its chemical inertness, and its adducts with carbenes could be regarded as a source of ‘active’ nitrous oxide. Practical outcome of our work was the development of highly efficient synthesis of industrially important azoimidazolium dyes, which are employed for coloration of natural and synthetic fibers

Shanghai Cooperation Organization- 1st Young Scientists Conclave (SCO-YSC 2020)
A virtual event organised in India at CSIR-IICT, Hyderabad
Theme: Shaping SCO-STI Partnership: Young Scientists Perspectives

Major awards/ Achievements

Finalist, European Young Chemist Award, EuCheMS Congress, 2012

Honored by the governor of Saint-Petersburg as the best undergraduate student of Saint-Petersburg State University, 2010

Scholarship of the President of Russian Federation, 2010

Possible collaboration with SCO countries *Research projects, project evaluation, scientific and educational collaboration*

Key words *Chemistry, energy conversion, catalysis*