Tokyo University of Agriculture and Technology
Institute of Global Innovation Research

グローバルイノベーション研究院　公開セミナー
Institute of Global Innovation Research Open Seminar

# Enhancing the understanding of nitrous oxide reduction for utilization in greenhouse gas


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東京農工大学 小金井キャンパス 科学博物館 3階講堂
Lecture Hall, 3rd Fl., Nature and Science Museum, Koganei Campus TUAT

Thursday, June 20 2019, 15:00 ~ 16:30


### Abstract

Nitrous oxide (N2O) is a potent greenhouse gas that originates mainly from various biological reactions, including nitrification and denitrification. The sole sink of N2O, biological N2O reduction has long been discounted as one of the reactions constituting the denitrification pathway. However, recently, the possibility of utilizing microbial N2O reduction as an independent energy-conserving reaction for reducing N2O emissions from the its hotspots has gained attention from the scientific world and the industry alike. Prof. Yoon's recent research revealed that certain groups of nosZ-possessing organisms have significantly higher affinity towards N2O, and have identified a naturally-abundant obligate aerobe, Gemmatimonas spp., as being capable of carrying out N2O reduction, which is a strictly anaerobic process. Recently, the Yoon Research group taken a step further from enhancing understanding these organisms to designing biofilter-type reactors utilizing naturally enriched high-affinity N2O reducers for removal of low-concentration N2O from the off-gas streams from activated sludge tanks of wastewater treatment plants. Successfully verified of its feasibility in laboratory experiments, the biofiltration system is currently under examination at a pilot plant constructed at an actual wastewater treatment plant in Gapyeong, Korea.


### Brief Biography

Dr. Sukhwan Yoon is an Associate Professor in the Department of Civil and Environmental Engineering at Korea Advanced Institute of Science and Technology. Dr. Yoon earned a Ph.D. degree in Environmental and Water Resources Engineering at the University of Michigan. He has been a Postdoctoral Fellow at Max Planck Institute for Terrestrial Microbiology in Germany and the University of Tennessee before starting his professorship at KAIST. Dr. Yoon has published his works in top-ranked journals in the fields of applied microbiology and microbial ecology. Because of his outstanding activities, he has received numerous awards and honors.

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