SOCIÉTÉ CHIMIQUE DE GENÈVE

# Biological nitrogen fixation: Cooperativity, artificial (re)activation and biotechnological prospect


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Industrial ammonia fertilizer production has played a key role in the growth of the human population, where it is thought that ~50% of the nitrogen found in our bodies originates from the Haber-Bosch process. Dinitrogen is reacted with molecular hydrogen over K-promoted Fe catalyst beds in a process that is highly efficient, but which also results in the consumption of 1-2% of global energy and a carbon footprint greater than that of global aviation.

In nature, a single class of metalloenzymes named nitrogenases employs Fe-containing metal centers to catalyze the fixation of dinitrogen to ammonia under ambient conditions, achieving up to 75% selectivity. However, many questions remain surrounding nitrogenase's catalytic mechanism and multiple limitations must be surmounted to exploit this enzyme in new biotechnologies.

This seminar will present our recent efforts ultimately aimed at interfacing nitrogenases with electrodes where renewable electrical energy could drive ammonia production, namely (i) understanding why nitrogenase has ~$C_2$ symmetry and (ii) whether we can produce this metalloenzyme in biotechnologically malleable organisms.

**Ce conférence sera précédé par l'assemblée générale :**

## JEUDI 23 MARS 2023 à 17h30

**Université de Genève – Bâtiment Science III**
**Auditoire A-100**
**30 quai Ernest-Ansermet Genève**

***La conférence est publique***


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