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New catalytic materials are key to the green transition

The development of a sustainable energy system puts renewed focus on catalytic processes for energy conversion. Electricity production from solar and wind is becoming economically competitive but we need to be able to store energy from these intermittent sources. Storage in the form of chemical bonds as fuels is very attractive, but converting electrical into chemical energy efficiently will require completely new catalytic materials. Insight into the way the catalysts work at the molecular level may prove essential to speed up the catalyst discovery process. The lecture will outline a theory of heterogeneous catalysis that singles out the most important parameters determining catalytic activity and selectivity. I will use nitrogen reduction to ammonia as the main example and discuss the possibility to find sustainable alternatives to the well-known Haber-Bosch process.

Jens K. Nørskov holds the Villum Kann Rasumussen professorship at the Technical University of Denmark and he is chairman of the Danish National Research Foundation. His research aims at developing theoretical methods and concepts to understand and predict properties of materials focusing primarily on catalysis and sustainable energy solutions. He has received a number of awards and honors, most recently the Eni Award for Frontiers in Energy, the Ångström Medal, the Havganga Medal, the Niels Bohr International Gold Medal, the ETH Zurich Chemical Engineering Medal, and he is a Clarivate Citation Laureate. Nørskov holds several honorary doctorates and he is a member of the Royal Danish Academy of Science and Letters, the Danish Academy of Engineering (ATV), and a foreign member of the US National Academy of Engineering.

