



The Hebrew University Center  
for Nanoscience & Nanotechnology



האוניברסיטה  
העברית  
בירושלים

## Nano Seminar

# Sustainable solutions for low-carbon applications

## Prof. Gadi Rothenberg

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### **Abstract:**

Our society is starting to realise that we must move towards the long-term goals of CO<sub>2</sub>-neutral processes and a circular economy, or face the consequences. Many people talk about this, but we chemists can actually do something about it. In the lecture, I will present a short overview of the activities of the Heterogeneous Catalysis & Sustainable Chemistry group in Amsterdam. I will explain our approach of using fundamental concepts in catalysis to design new and effective materials for real-life applications. Then I will illustrate our activities with four recent examples: the design and application of simple and cheap materials for fuel-cell electrodes,[1,2] a techno-economic approach for recycling the ultimate waste,[3] the invention and pilot application of a new catalyst for cleaning cyanide from industrial waste streams,[4] and a possible route for reacting CO<sub>2</sub> with a lower thermodynamic penalty.[5]

[1] Understanding oxygen activation on metal- and nitrogen-co-doped carbon catalysts. D. Eisenberg, T.K. Slot and G. Rothenberg, ACS Catal., 2018, 8, 8618–8629. 10.1021/acscatal.8b01045

[2] A Simple Synthesis of an N-Doped Carbon ORR Catalyst: Hierarchical Micro/Meso/Macro Porosity and Graphitic Shells. D. Eisenberg, W. Stroek, N. J. Geels, C. S. Sandu, A. Heller, N. Yan and G. Rothenberg, Chem. Eur. J., 2016, 22, 501-505. 10.1002/chem.201504568 (open access)

[3] Converting waste toilet paper to electricity: A first-stage techno-economic feasibility study. E. van der Roest, M. van der Spek, A. Ramirez, B. van der Zwaan and G. Rothenberg, Energy Technol., 2017, 5, 2189-2197. 10.1002/ente.20170024 (open access)

[4] Method for removing cyanide compounds from wastewater. P. Oulego, N.R. Shiju and G. Rothenberg, WO2016/120394.

[5] Tuning of Conversion and Optical Emission by Electron Temperature in an Inductively-Coupled CO<sub>2</sub> Plasma. D. Zhang, Q. Huang, E.J. Devid, E. Schuler, N.R. Shiju, G. Rothenberg, G. van Rooij, R. Yang, K. Liu and A.W. Kleyn, J. Phys. Chem. C, 2018, 122, 19338–19347. 10.1021/acs.jpcc.8b04716 (open access)

**Gathering & Refreshments at 10:50**

**Tuesday, November 6<sup>th</sup> 2018, 11:00 at the Seminar Hall**  
Los Angeles Building, entrance floor.