

János Szanyi, Ph.D.

Staff Scientist

Institute for Integrated Catalysis, Pacific Northwest National Laboratory
PO Box 999, MSIN: K8-87
Richland, WA 99352

janos.szanyi@pnl.gov

Tel: 509-371-6524

Professional Interests

- Experimental surface chemistry and catalysis on metal and metal oxide surfaces
- Spectroscopic characterization of surface species relevant to the understanding of the kinetics and mechanisms of environmentally important catalytic reactions
- Preparation and characterization of oxide nanostructures
- *in operando* kinetic/spectroscopic studies of heterogeneous catalytic processes

Education and Employment

2007-Present	Staff Scientist, Catalysis Science Group, Pacific Northwest National Laboratory, Richland, WA
2001-2007	Senior Research Scientist II, Interfacial Chemistry and Engineering, Pacific Northwest National Laboratory, Richland, WA
1996-2001	Research Scientist, Glass Technology Center, PPG Industries, Inc., Pittsburgh, PA
1993-1996	Postdoctoral Research Associate, Chemical Sciences Division, Los Alamos National Laboratory, Los Alamos, NM (Advisor: Dr. MT Paffett)
1988-1993	Ph.D., Physical Chemistry, Texas A&M University, College Station, TX (Advisor: Prof. DW Goodman)
1987-1988	Postdoctoral Research Associate, Texas A&M University, College Station, TX (Advisor: Prof. JH Lunsford)

- 1982-1986 Doctor of University, Central Research Institute for
Chemistry of the Hungarian Academy of Sciences,
Budapest, Hungary
- 1977-1982 B.S. Chemistry, University of Szeged, Szeged, Hungary

Appointments and Distinctions

- Member of the American Chemical Society
- Member of the North American Catalysis Society
- Scientific Advisory Board Member to *Catalysis Letters*

Publications: >160 peer reviewed; H-index: 37

Dr. Szanyi's research is focused on surface science, spectroscopy and kinetic studies on heterogeneous catalytic reaction systems aimed at understanding structure-reactivity relationships. In particular, he is interested in understanding the mechanistic consequences of very high (atomic) metal dispersion on different support materials. Using a series of ensemble averaged spectroscopy methods he investigates the fundamental properties of metal atoms and small metal clusters prepared under well controlled UHV conditions. These results provide information on the energetics of the interactions between highly dispersed metals and selected probe molecules.



Applying in situ RAIR spectroscopy they study the binding configurations of adsorbates to metals, and identify surface species present on the metal and support materials under elevated reactant pressures. Simultaneously, they are conducting detailed kinetics and *operando* spectroscopy measurements on model high surface area supported metal catalysts using flow reactors and SSITKA/FTIR/MS techniques. These measurements provide detailed kinetic information together with surface speciation that allow them to greatly enhance our mechanistic understanding of heterogeneous catalytic systems, in particular the reduction of CO₂. Dr Szanyi is also involved in research related to the fundamental understanding of automotive emission control catalysis, conducting research in selective catalytic reduction of NO_x on zeolite-based catalysts, low temperature NO and CO oxidation on metal oxides, and low temperatures NO_x and HC storage in zeolites.