

**Prior
group members**

Dr. S. Funk
Dr. J. Wang
B. Hokkanen
E. Johnson
T. Nurkic
Shweta Sah
J. Goering, MS
P. Nevin
R. Mahalakshmi

Current group

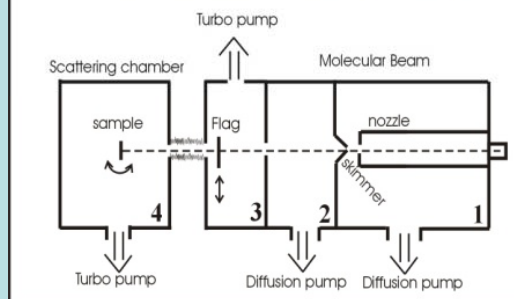
M. Komarneni
A. Sand
Dr. E. Kadossov
R. Mahalakshmi
J. Justin
Dr. Reine Abba
J. Hjelle

Guest from Native American Colleges (NATURE program), High schools, and Concordia College

New mailing address: Dr. Uwe Burghaus
Associate Professor - Surface Chemistry
Department of Chemistry and Molecular Biology
NDSU Dept. 2735, PO Box 6050, Fargo,
ND 58108-6050, USA

For DHL, FedEx and UPS deliveries, please use:
Department of Chemistry and Molecular Biology,
NDSU Ladd Hall 208, 1231 Albrecht Blvd, Fargo,
ND 58102, USA

Phone 701-231-9742 FAX 701-231-8831
Email Uwe.Burghaus@ndsu.edu
www.ndsu.edu/chemistry <http://www.uweburghaus.de>

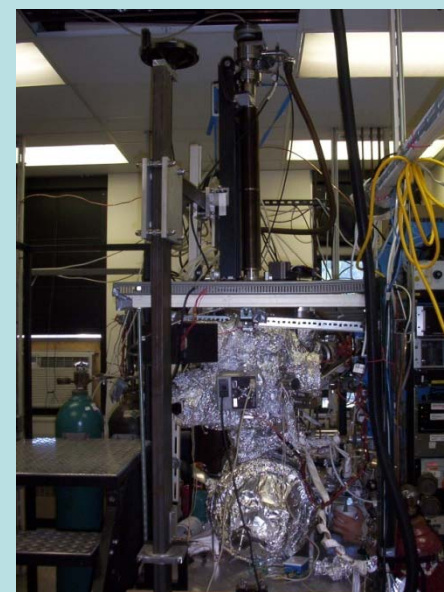


Adsorption/reaction dynamics: The workhorse of our group is this molecular beam scattering system, it's a kind of LASER but we use beams of "real" particles (He, alkanes, water, alcohols, CO, NO, CO₂, etc..). We just could upgrade the system by an XPS spectrometer and larger pumps (DoE).

Kinetics: The cover figure shows an ultra-high vacuum kinetics system which has just been upgraded with a new preparation chamber (NSF).

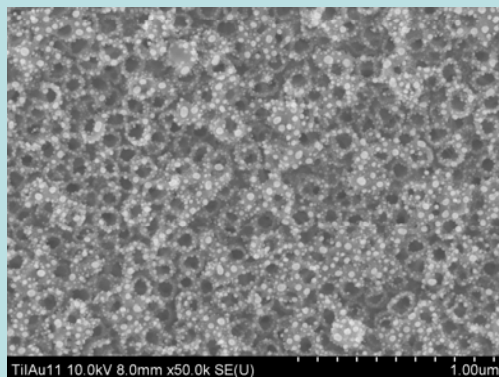
Surface Nano Materials Chemistry

<http://ndsu.edu/chemistry>



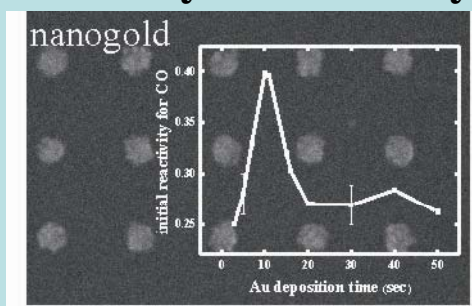
U. Burghaus
Department of Chemistry
& Molecular Biology
North Dakota State University
August 2009

Au@TiNTs – gold nanoparticles on titanium dioxide nanotubes

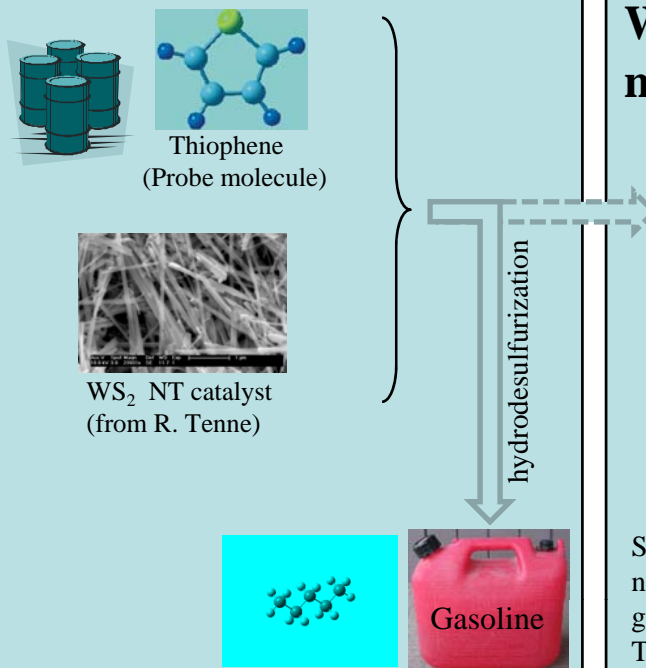


The main application for this fancy carpet is photo catalysis including solar cells, water splitting, etc.. Here we work together with P. Schmuki's group (Germany).
e.g. Nano Letters 7 (2007) 1091

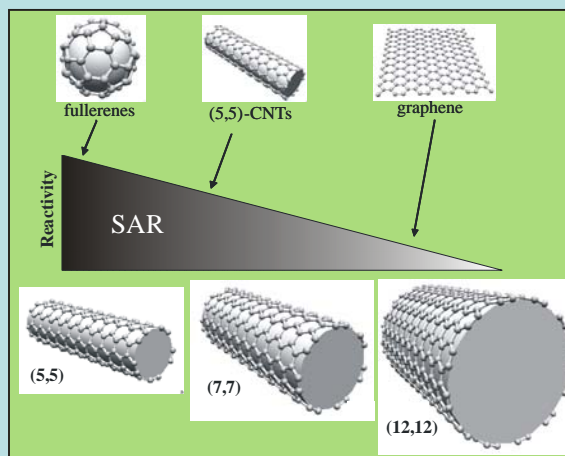
Model Array Nano Catalysts



Model nano array catalysts consist of a predetermined structure of nanometal dots with perfect control over their morphology which is pertinent for model studies. This project is a collaboration with national labs in Berkeley and Argonne/Chicago. Electron beam lithography is used to manufacture the samples.
(NSF CAREER)

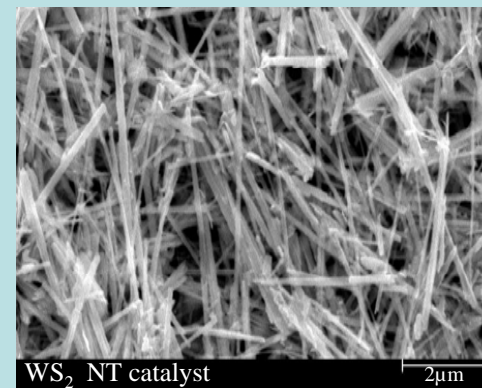


CNTs - Carbon nanotubes

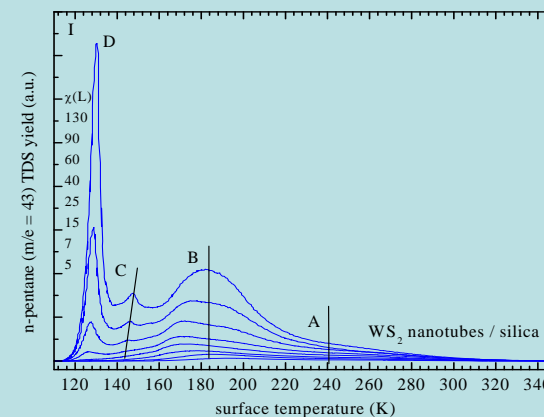


We study how the crystal structure of carbon nanotubes affects their catalytic properties; SAR – structure activity relationship.
e.g. Chemical Physics Letters 470 (2009) 300

WS₂ NT – Tungstendisulfide nanotubes to clean up fuel



Shown here is another example of inorganic nanotubes which may belong to the next generation of hydrodesulfurization catalysts. Thus, sulfur contaminations will be chemically transformed into alkanes. We collaborate with R. Tenne (Israel) on this project. (DoE)
e.g. Catal Letters 129 (2009) 66; 125 (2008) 236



The kinetics experiments indicate that thiophene adsorbs inside of the WS₂ NT which act as a nano size test tube.

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