



# *Development of Collaborations through Scientific Discussions at Meetings in Interesting Places*

*Randall Winans*

*BESSRC XOR/XFD and CHM*

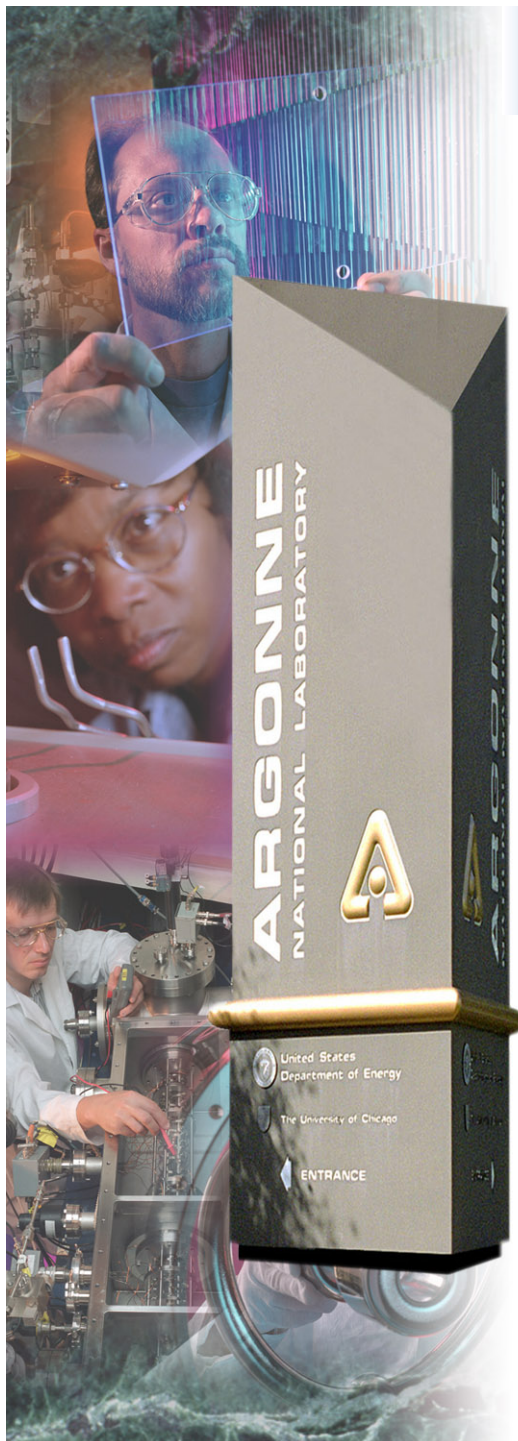
*Argonne National Laboratory*

**Successful Multi-Discipline Collaborations**

**December 13, 2005**



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## *Collaborations – Examples of Connections with Scientists*

**Joe Joseph – Amoco – FE CRADA**

**John Shinn – Chevron – FE CRADA**

**Luann Becker – UC San Diego**

**Jen Blank – UC Berkeley**

**Ray Tanaka – Idemitsu – NEDO**

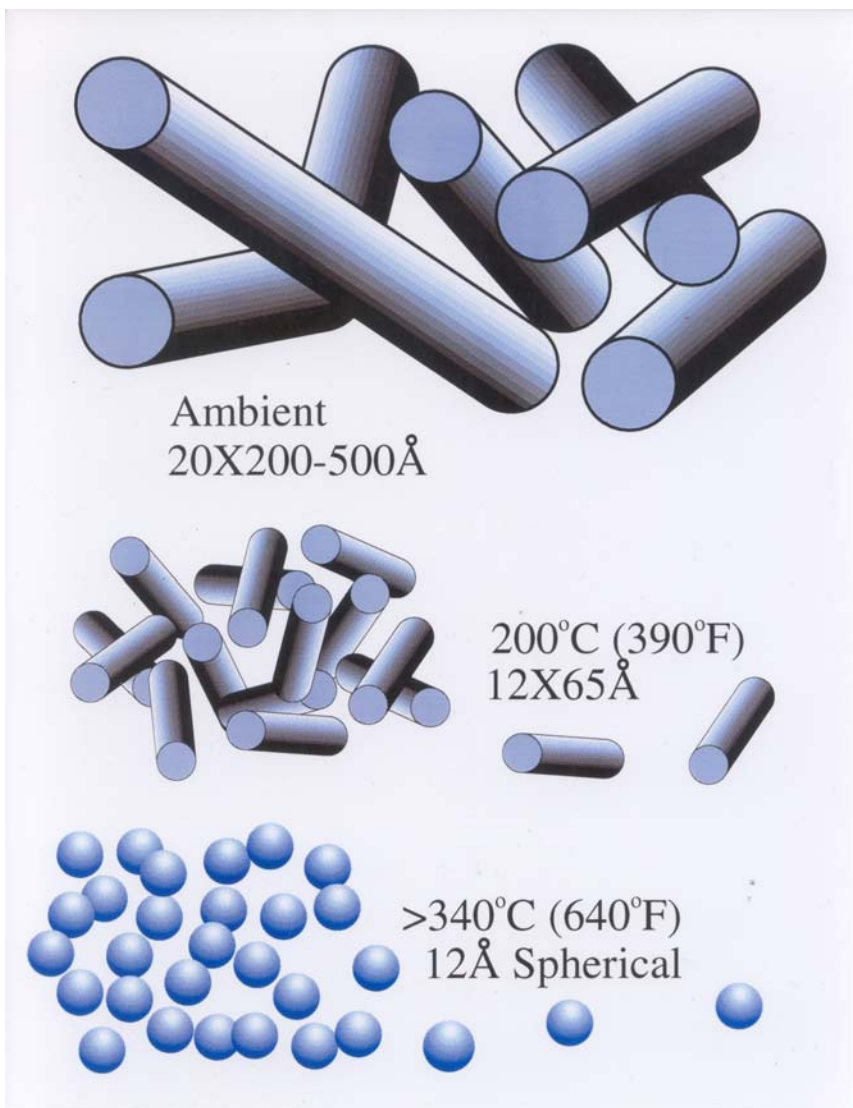
**Ron Pugmire U of Utah and Tom Fletcher BYU – ACERC – NSF**

**Peter Hall – U of Strathclyde – UK Gov**

**Tony Clemens – CRL – New Zealand Gov and US State Dept**

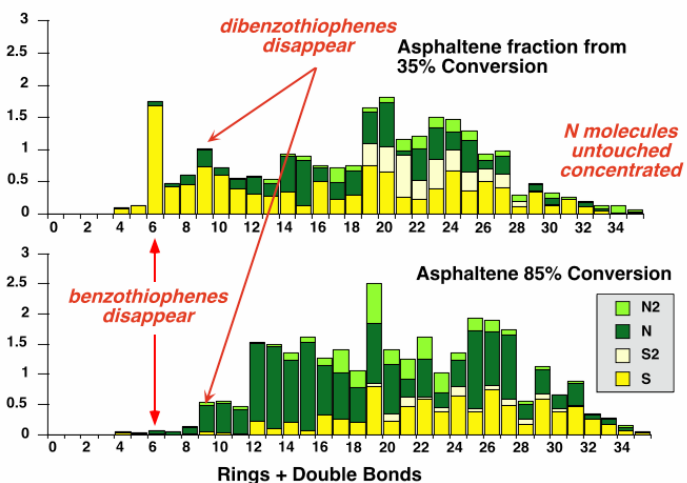
## Improved Resid Upgrading

*J. T. Joseph, Amoco and R.E. Winans and J. E. Hunt, ANL*



### SANS Results

Thiyagarajan, P.; Hunt, Jerry E.; Winans, Randall E.; Anderson, Ken B.; Miller, Jeffrey T. Temperature-Dependent Structural Changes of Asphaltenes in 1-Methylnaphthalene. *Energy & Fuels* (1995), 9(5), 829-33.



### HRMS Results

Miller, J. T.; Fisher, R. B.; Thiyagarajan, P.; Winans, R. E.; Hunt, J. E. Subfractionation and Characterization of Mayan Asphaltene. *Energy & Fuels* (1998), 12(6), 1290-1298.

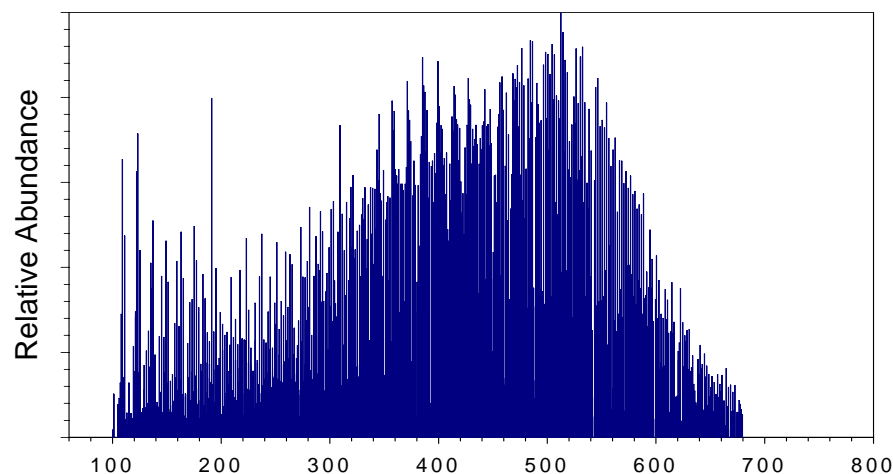
## Characterization of Acidic Compounds in Vacuum Gas Oils

Randall E. Winans and Nancy A. Tomczyk

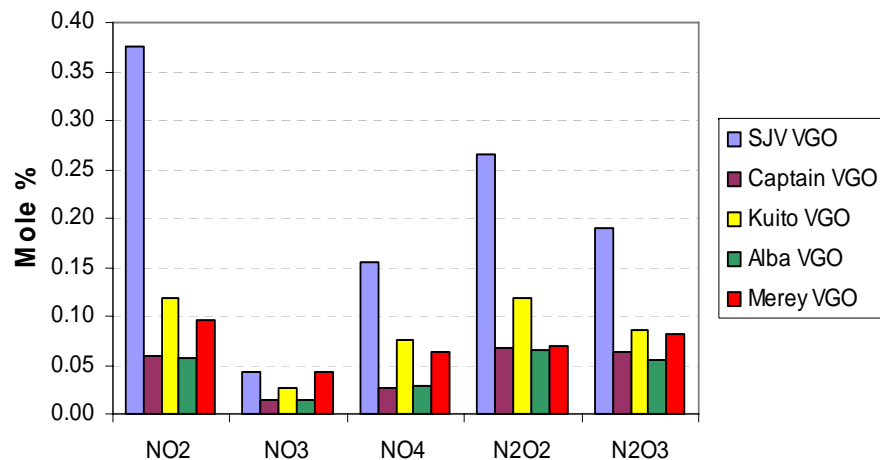
Chemistry Division, Argonne National Laboratory

John H. Shinn Chevron-Texaco

### SJV Crude



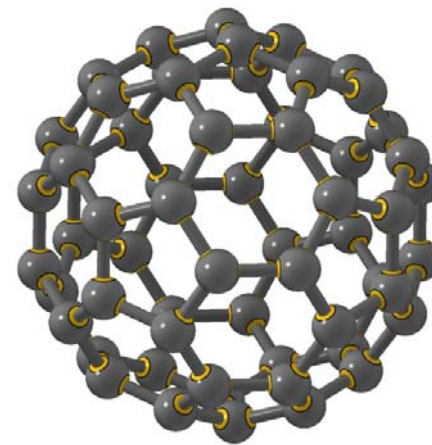
*Averaged HRMS Data  
of Acids*



Tomczyk, Winans, Shinn, Robinson  
*Energy & Fuels* **2001**, 15, 1498-1504

## ***Fullerenes in the 1.85-billion-year-old Sudbury impact structure***

***Becker, Luann; Bada, Jeffrey L.; Winans, Randall E.; Hunt, Jerry E.; Bunch, Ted E.; French, Bevan M Science (1994), 265(5172), 642-5.***

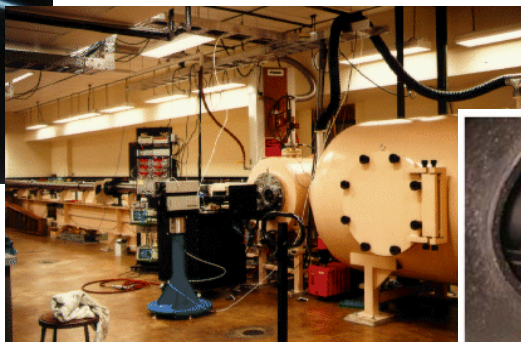


**Becker, L.; Bada, J. L.; Winans, R. E.; Bunch, T. E. Fullerenes in Allende meteorite. Nature (London) (1994), 372(6506)**

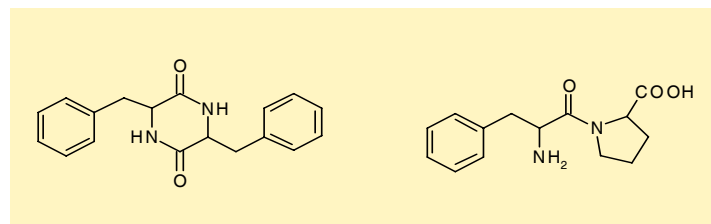
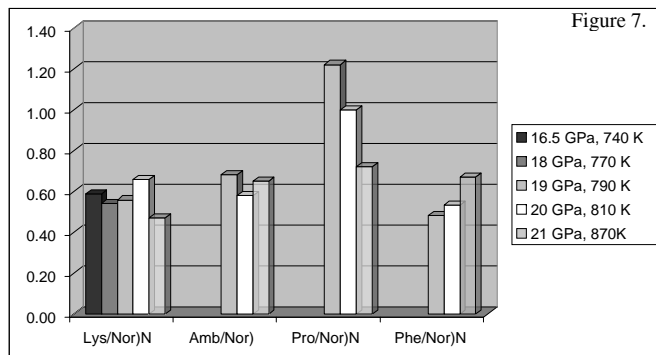


## An Experimental Study of the Shock Reactivity and Stability of Cometary Organic Matter

Blank, Jennifer G.; Miller, Gregory H.; Ahrens, Michael J.; Winans, Randall E.. Experimental shock chemistry of aqueous amino acid solutions and the cometary delivery of prebiotic compounds. *Origins of Life and Evolution of the Biosphere* (2001), 31(1-2), 15-51.



Shot 78, post-fire



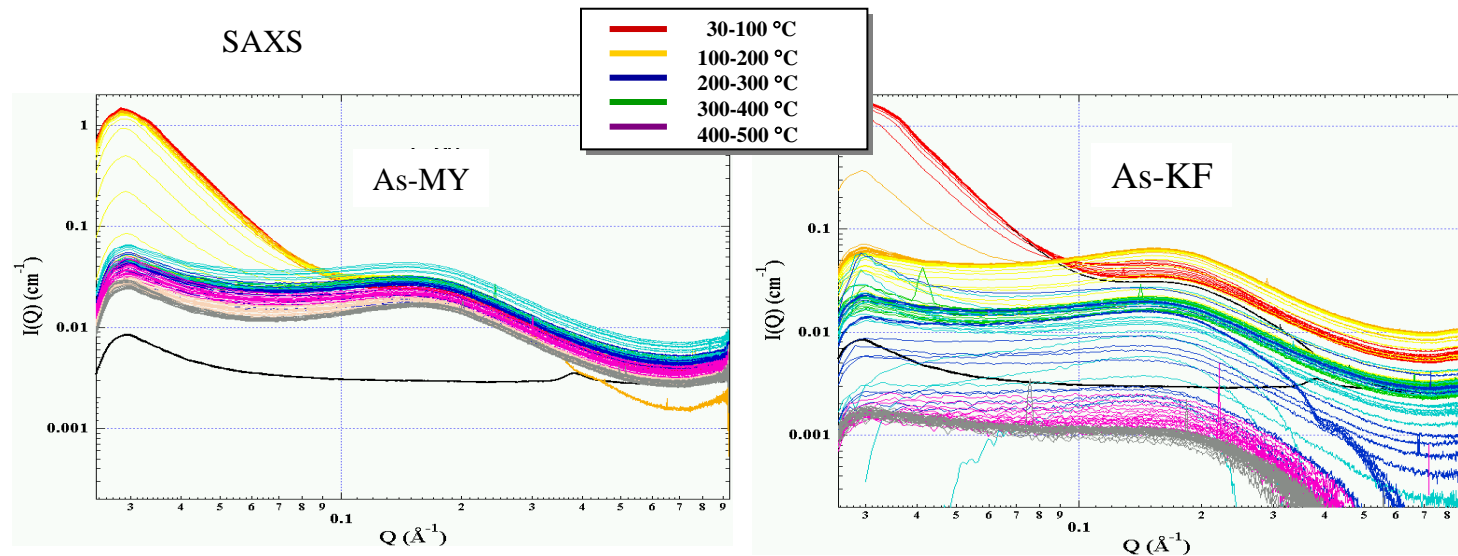
# Characterization and Reactivity of Asphaltenes

*Energy & Fuels* 2004, 18, 1118–1125

## Characterization of Asphaltene Aggregates Using X-ray Diffraction and Small-Angle X-ray Scattering

Ryuzo Tanaka,<sup>\*,†</sup> Eisaku Sato,<sup>†</sup> Jerry E. Hunt,<sup>‡</sup> Randall E. Winans,<sup>‡</sup>  
Shinya Sato,<sup>§</sup> and Toshimasa Takanohashi<sup>§</sup>

*Central Research Laboratories, Idemitsu Kosan Co., Ltd., 1280 Kamiizumi,  
Sodegaura 299-0293, Japan, Chemistry Division, Argonne National Laboratory,  
9700 South Cass Avenue, Argonne, Illinois 60439, and Institute for Energy Utilization,  
National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa,  
Tsukuba 305-8569, Japan*



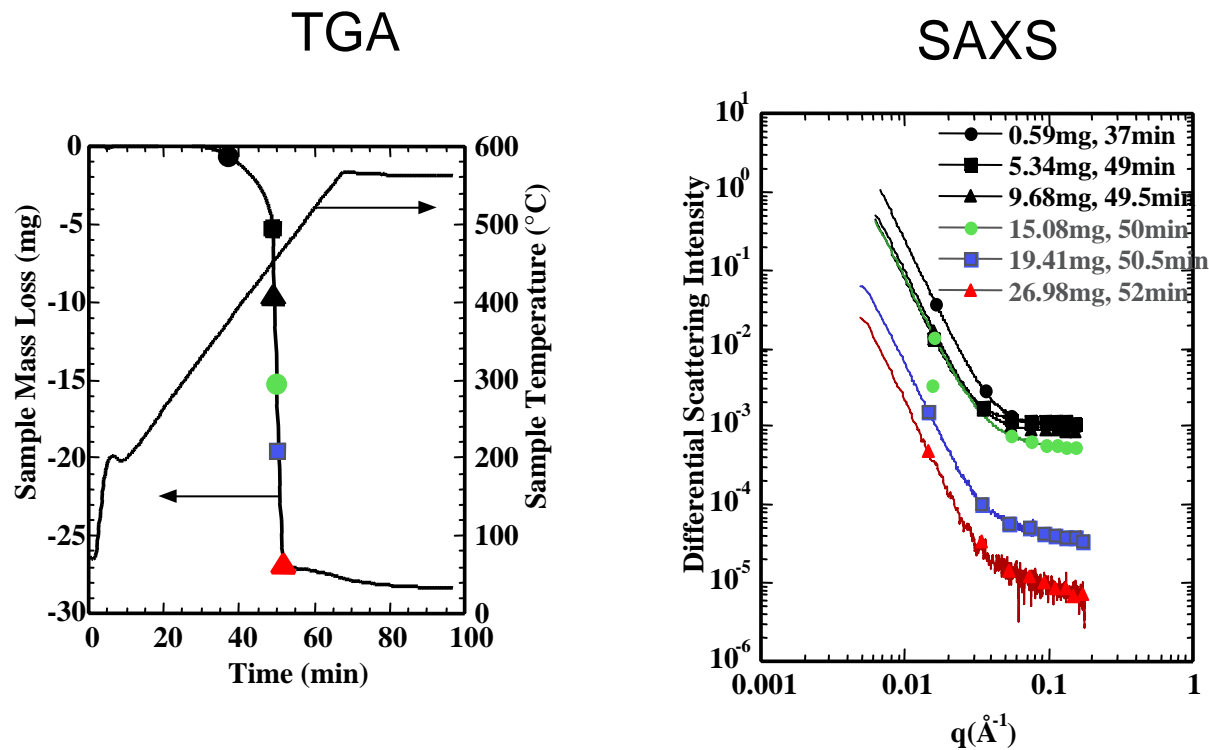
Two main scattering are observed

$Q < 0.1 \text{ \AA}^{-1}$  : large aggregates

$Q \approx 0.18 \text{ \AA}^{-1}$  : small aggregates

# “Real time” determination of porosity development in carbons: a combined SAXS/TGA approach

Saran Char + oxygen



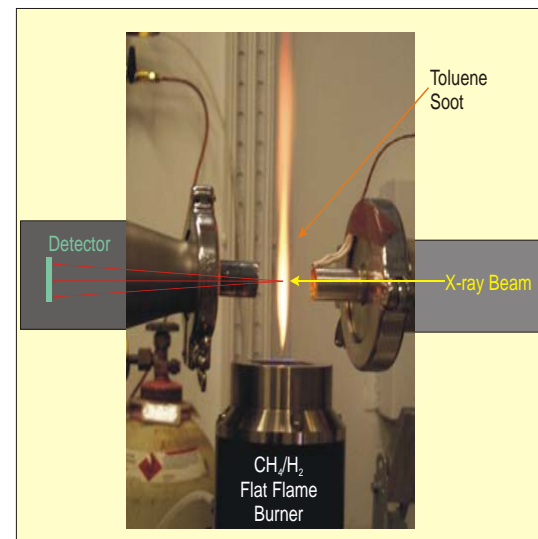
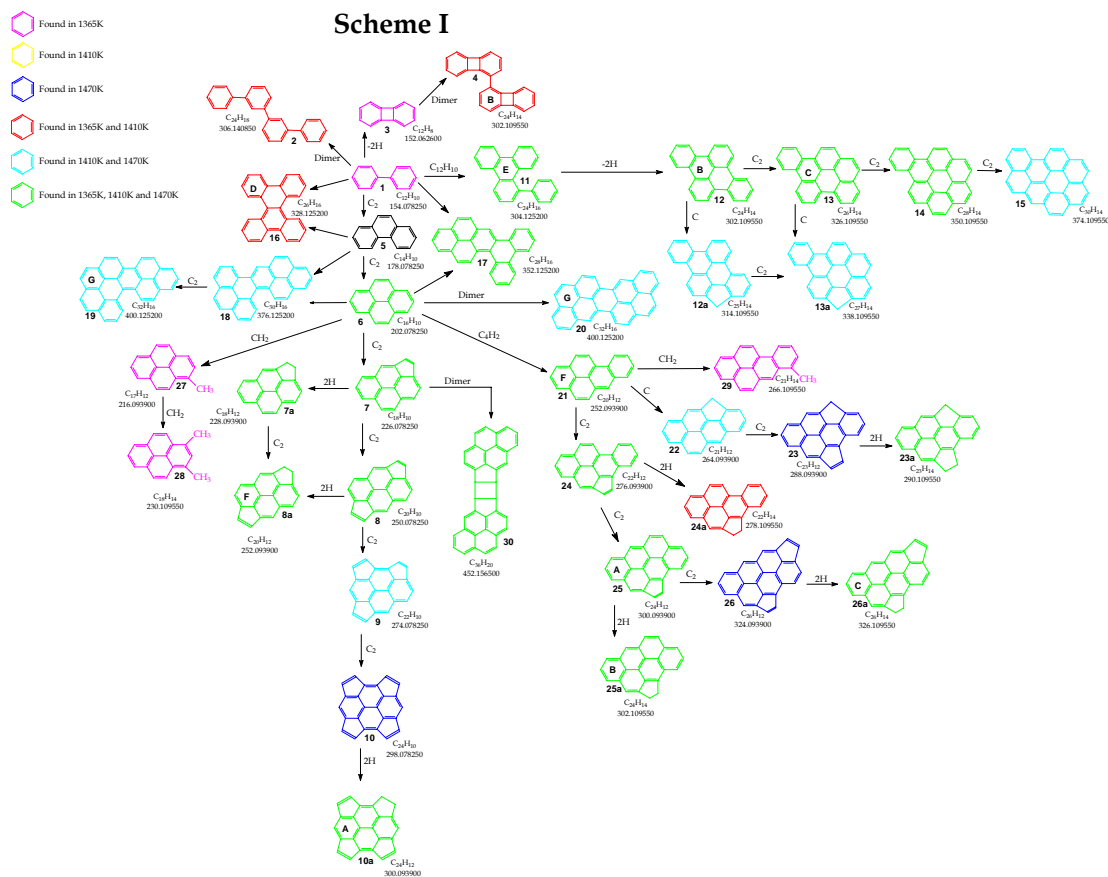
Calo, J. M.; Hall, P. J.; Houtmann, S.; Lozano-Castello, D.; Winans, R. E.; Seifert, S. *Studies in Surface Science and Catalysis* (2002), 144(Characterization of Porous Solids VI), 59-66

Brown University, University of Stratclyde and Argonne National Lab



# Molecular Chemistry in Flames

R. Pugmire, U of Utah and T. Fletcher, BYU  
 R. Winans, J. Hessler and N. Tomczyk, ANL



## *CO<sub>2</sub> Sequestration in Coal Seams*

Tony Clemens, CRL and Randall Winans, ANL

