NCS *NEWS*

October 1999

A Publication of the National Capital Section of the American Institute of Chemical Engineers

Upcoming Meeting of the AIChE National Capital Section

"Chemical Engineering Aspects of Advanced Ceramic Materials Synthesis and Processing"

Dr. Jan A. Puszynski
Chemistry and Chemical Engineering Department
South Dakota School of Mines and Technology

Date and time: Wednesday, October 27th, 6pm
Location: Steak and Ale Restaurant, Vienna, VA (see map on page 3 of this newsletter).

Reservations: Call Victoria Guvanasen at 703/736-4544.

OCTOBER 1999 NCS MEETING

The National Capital Section of the AIChE has scheduled an evening meeting for October 27, 1999. The invited speaker is Dr. Jan A. Puszynski of the South Dakota School of Mines and Technology.

Abstract: During the past two decades, significant progress has been made in the area of synthesis and processing of advanced ceramic materials. Chemical engineers have made substantial contributions into that area. The main accomplishments include chemical vapor deposition, chemical vapor infiltration, synthesis of nano-size powders by sol-gel, flame, plasma and laser techniques, devlopment of ceramic membranes, fibers, single crystals and composites as well as processing of powders prior to densificiation. Overview of the major accomplishments made by chemical engineers and current research and industrial developments in the field of advanced ceramic materials will be presented.

The main topic of the presentation will focus on the fundamental aspects of combustion synthesis and its potential industrial applications. Combustion synthesis, also called self-propagating high-temperature synthesis (SHS), is a relatively new technique, which allows formation of inorganic materials without any significant external energy input. The main advantages of this method are: i) versatility of a combustion reactor, ii) very short reaction times, iii) possibility of synthesizing non-stoichiometric and complex compounds, iv) high purity of final products, and v) possibility of *in situ* densification of combustion synthesized materials. The experimental results of high-pressure gas-solid combustion synthesis of advanced ceramic powders, such as Si_3N_4, AlN, SiC, TiN, and sialons will be presented. Methods of controlling phase composition, particle size, and morhpology of synthesized ceramics will be discussed in detail. Reaction engineering aspects of strongly exothermic reacting systems will be addressed as well. Technological applications of this method as well as its utilization for *in situ* densification will be discussed if time permits.

About the Speaker: Professor Jan A. Puszynski joined the chemical engineering faculty at the South Dakota School of Mines and Technology in September 1991. Previously, he worked at the State University of New York at Buffalo as a research professor. Dr. Puszynski's research interest is on reaction engineering aspects of noncatalytic strongly exothermic processes, synthesis of advanced ceramic and intermetallic materials and their processing, and mathematical modeling of condensed-phase combustion processes. Dr. Puszynski has published over ninety papers in peer-reviewed journals and has made over one hundred presentations at national and international meetings. During his career, he has successfully implemented several projects into the industry. Professor Puszynski is a recipient of several prestigious awards, including Aspen Technologies Outstanding Professor Award and recent S.D. Board of Regents Research Award. Currently, Dr. Puszynski is on the sabbatical leave working at the Naval Surface Warfare Center in Indian Head, MD.

Meeting Time/Location: This dinner meeting will be held on October 27th at the Steak and Ale Restaurant in Vienna, VA (see map on following page). The restaurant is located at 215 Maple Ave, West. The meeting begins at 6:00 PM with a cash bar followed by dinner at 6:45 PM. The speaker's presentation will commence at 7:30 PM.

Menu/Reservations: The restaurant is offering the following four dinner choices:

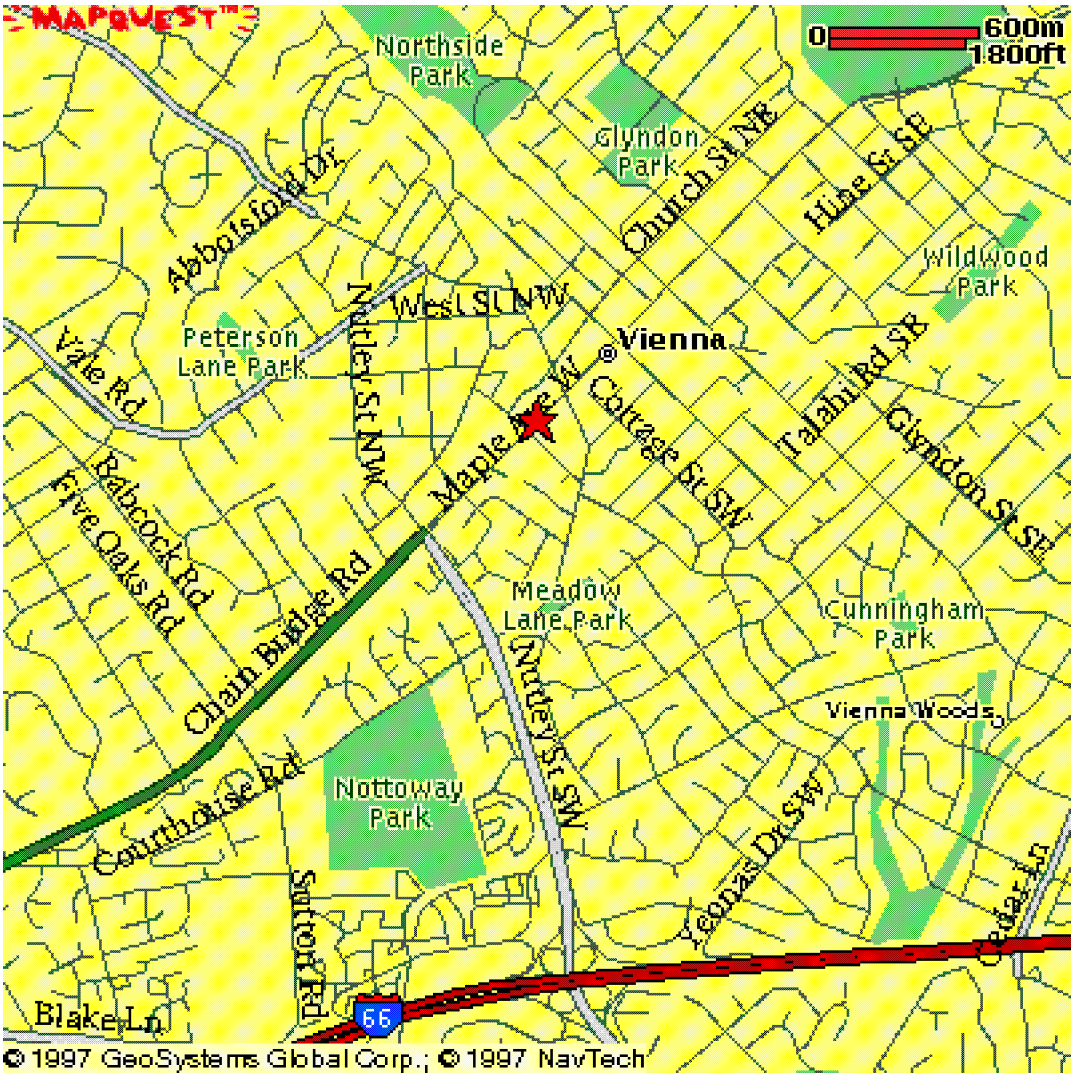
Signature Herb Roasted Prime Rib
: 8 oz. portion, perfectly aged and slowly roasted.

Sirloin Steak
: 9 1/2 oz. top sirloin grilled to your liking.

Hawaiian Chicken
: Two chicken breasts, specially marinated and grilled.

Stuffed Shrimp
: Four large shrimp filled with seasoned crabmeat and seafood stuffing.

Please call NCS Treasurer Victoria Guvanasen (ph: 703/736-4544; fax: 703/471-4180; e-mail: vmg@hgl.com) before noon October 26th (or sooner, if possible) for reservations and selection of dinner choice.



A map of the location (denoted by the star in the approximate center of the map) of the Steak and Ale Restaurant on 215 Maple Ave, West, in Vienna, VA.

Driving Instructions:

From the Capital Beltway (495) take I-66 West towards Front Royal (about 2 miles).

Take Nutley Street (first exit, VA rte. 243) towards Vienna (about 1 mile).

Make a right on to Maple Ave. The restaurant is about 0.4 miles on the left.

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