AIChE

Rocky Mountain AIChE News

March 2013 Volume 22 Number 6

March Section Meeting: Supercritical Carbon Dioxide Brayton Cycles: Next Generation Power

Electric power generation has been dominated by the steam Rankine power cycle for over a century. In the past few decades air Brayton cycles, represented by the modern gas turbine, and combined cycle systems (air Brayton / steam Rankine) have come into their own due to improvements in high-temperature materials and turbine efficiency. Yet these power cycles are not an optimal fit for many power applications. Recently, a power cycle employing supercritical carbon dioxide (s-CO2) as the working fluid has been gaining advocates from a wide range of potential users, including Gen IV nuclear plant designs, oxy-fuel fossil systems compatible with carbon capture, and concentrating solar power (CSP).

Supercritical CO2 operated in a closed-loop Brayton cycle offers the potential of higher cycle efficiency versus superheated or supercritical steam cycles at comparable temperatures. Brayton-cycle systems using s-CO2 have smaller weight and volume, lower thermal mass, and less complex power blocks versus Rankine cycles due to the higher density of the fluid

March Section Meeting

Topic: Supercritical Carbon Dioxide Brayton Cycles: Next Generation Power

Speakers: Dr. Craig Turchi, Sr. Engineer
Nat'l Renewable Energy Lab

Date: Tuesday, March 19th

Time: 6:00 Networking
6:30 Dinner
7:30 Presentation

Location: Hotel VQ
1975 Mile High
Stadium Circle
Denver 80204

Cost: (w/RSVP)* Members: $20
Non-Members: $25
Students & Unemployed: $10

Please RSVP by FRIDAY, March 15th, (early RSVPs are greatly appreciated!) indicating your name, phone number, and number of attendees. Please RSVP to Martin Vorum at rockyaiche@yahoo.com.

*Add $5 for attending meeting without RSVP

and simpler cycle design. The cycle is capable of achieving thermal-to-electric efficiencies in excess of 50% at temperatures much lower than required for air Brayton gas turbines. Many s-CO2 Brayton power cycle configurations have been proposed and studied for solar, nuclear, waste-heat recovery, and other applications.

The U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) has identified the closed-loop s-CO2 Brayton cycle as a leading candidate to increase the efficiency and lower the cost of CSP systems. This presentation will briefly review CSP technology, and then discuss the properties of the s-CO2 Brayton cycle, highlight features that make the cycle attractive for a diverse set of applications, and focus on the use of the power cycle for next-generation CSP plants. Current research sponsored by DOE at NREL in Golden, CO, is devoted to demonstrating a 10-MW s-CO2 power turbine – the largest such design yet built.

Dr. Turchi is a senior engineer at the National Renewable Energy Laboratory in Golden, CO. He has over 20 years of experience in technology evaluation, including laboratory supervision, pilot-plant design and operation, and system scale-up and costing. He started his career with NREL, then known as the Solar Energy Research Institute, in the early 1990s, spent over a decade in the private sector, and returned to join NREL's Concentrating Solar Power (CSP) team in 2008. In 2008, Dr. Turchi rejoined NREL to assist with system analysis and the development and assessment of heat-transfer fluids and thermal-storage concepts for CSP technologies. In his role as task leader for the CSP System Analysis task, he is responsible for cost analysis of CSP technologies and assessment of innovative, new technologies with application in CSP. Dr. Turchi has a PhD in chemical engineering from North Carolina State University.

OFFICER ELECTIONS FOR ROCKY MOUNTAIN AIChE BOARD MEMBERS

With our program year coming to a close, it is time give a big thank you to our board members for the past year and elect officers for the coming year. If you would like to volunteer for an officer position, please contact Kevin Milliman at Kmilliman94@gmail.com.

Judges Needed for Colorado School of Mine's Poster Contest

Colorado School of Mines' Department of Chemical and Biological Engineering hosts a summer undergraduate research program each year. We will have a poster session in August and would like to have local professionals as judges and attendees. Please take one minute to fill out the survey at the link below if you are interested in attending and/or judging the posters.
https://docs.google.com/forms/d/1xZudUdM4dL2hODqR8UUFRlOLK-DzkY3I3aYtlhfeuac/viewform

STATE SCIENCE FAIR

State Science Fair time is fast approaching. Judging will occur at CSU on April 10, 2013. If you aspire to participate in the next "America's Got Science Talent", this is the job for you. Contact Michael Mutnan at mmutnan@juno.com for more information.

We are classified as "Special Judges" since we focus on Chemical Engineering related projects. Awards (monetary and certificates) are given to 1st and 2nd Place in the Senior and Junior High Divisions. We also invite the winners to be our guests at one of our meetings.

The science fair group must be informed who our judges are by March 1 for inclusion into a "Judges Database". Once on the list, you will receive a packet with particulars, and more importantly, a badge that gets you into the judging area.

Michael can access the database for late inclusions. Last year badges were issued to judges not on our list, so a last minute decision seems to be acceptable.

In the past parking was available at the CSU Equestrian Center. This includes bus service to campus. Judging is held 12:15 p. m.to 5:00 p. m. A short meeting occurs at around 11:00 a. m. with lunch (pizza and drinks). A very intense, but very rewarding day awaits you. PARTICIPATE!!!!!

AIChE Meetings

2013

Mar 19-20	SPE/AIChE Workshop on Flow Assurance Austin, Texas
Apr 5-7	2013 Rocky Mountain Student Regional Conference New Mexico State University
Apr 28-May 2	AIChE 2013 Spring Meeting and 9th Global Congress on Process Safety San Antonio, TX
May 1-2	Industrial Water Use and Reuse Workshop San Antonio, Texas
June 11-13	2013 Process Development Symposium Oak Brook, IL

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The objectives of AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members, and to serve society, particularly where chemical, engineering can contribute to the public interest.

AIChE Rocky Mountain is a public non-profit 501(c)(3) organizations and thus any and all donations are tax deductible.

Rocky Mountain AIChE News Publication Schedule

April 2013 issue
Articles due Wednesday, April 6th
Publish on Friday, April 8th
Meeting on Tuesday, April 19th

MEETING SCHEDULE

The Rocky Mountain District of AIChE generally meets the third Tuesday of every month, September through November and January through May.

Rocky Mountain AIChE News
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On the Web at:
http://rockymtn.aiche.org

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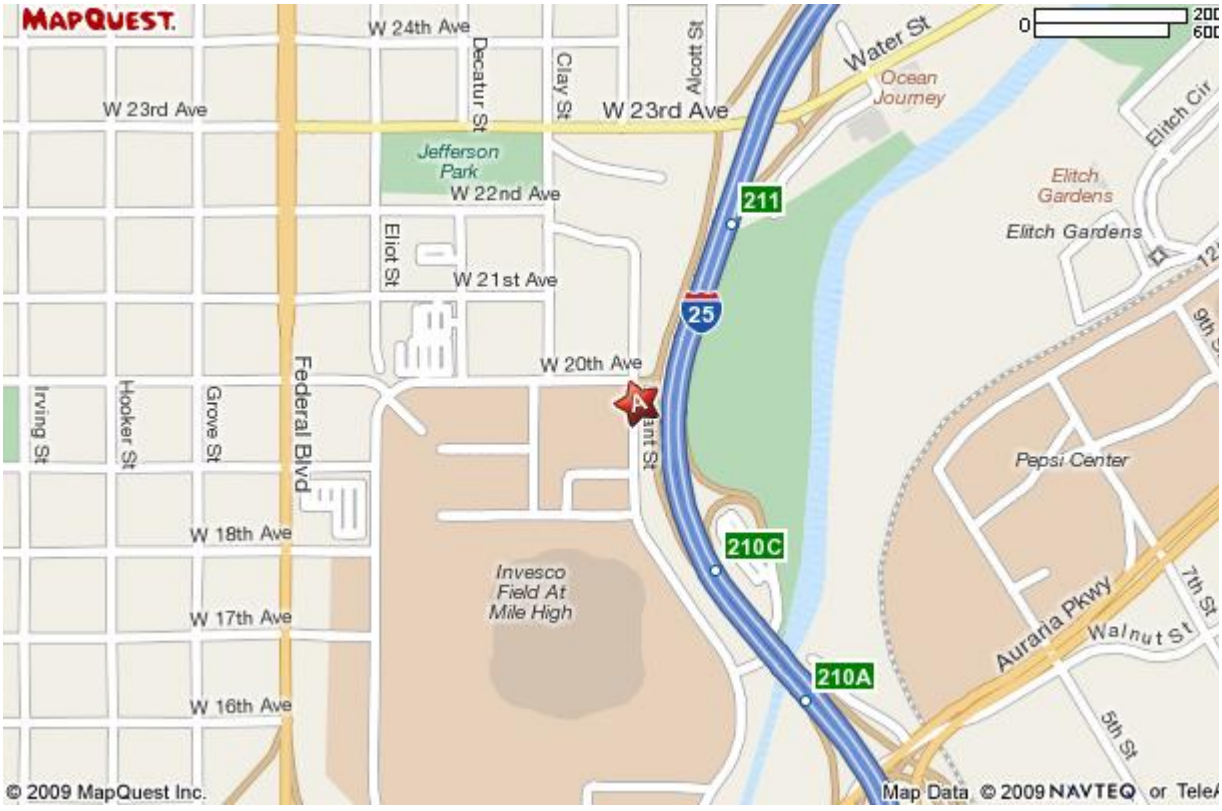

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Denver 80204

Northbound on I-25, take exit 210B toward 17th. Turn right at Bryant Street and look for destination on right.

Southbound on I-25, take the US85/US6 exit, then a slight left at Bryant St. and look for destination on the left.