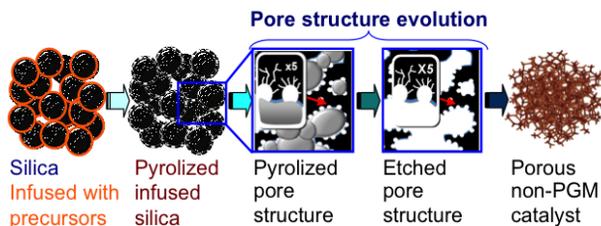


February 3, 2014 at 10:30am in BD 105

## abstract

This presentation brings examples from two materials synthesis platforms: aerosol processing in a format of spray pyrolysis<sup>1,2</sup> and colloidal approach based on sol-gel templating of micro-emulsions.<sup>3,4</sup> Both approaches have been used at UNM over the last decade to design electrocatalyst powders with varied chemical structure and desired morphology for fuel cell and related applications. The spray-based process results in formation of unique spherical, micron-sized aggregates consisting of sub-micron electrocatalyst particles where the nanometer sized active phases are highly dispersed. Examples include platinum group metals (PGM) and metal alloys; metal oxides, composite and non-noble or graphene metal electrocatalysts. Microemulsion-derived materials have three levels of morphology control: nanopores derived from micellar structure of the surfactant used, mesopores templated on the microemulsion droplets and macrostructured particles resulting from sheer mixing. We have developed these two approaches to produce not only traditional electrocatalysts (PGM and their allows supported as decorative phase on carbon blacks) but also a whole new set of reactive oxide and conductive oxide materials that serve as co-catalysts or non-carbonaceous supports.



## Dr. Plamen Atanasov

Department of Chemical & Nuclear Engineering  
University of New Mexico

## biosketch

Plamen Atanasov grew up in Bulgaria and graduated from the University of Sofia in 1987 specializing in Chemical Physics and Theoretical Chemistry. He received his doctorate from the Bulgarian Academy of Sciences in Physical Chemistry, specializing in Electrochemistry under the guidance of Prof. Iliia Iliev and Prof. Evgeni Budevski. Plamen Atanasov moved to the United States in 1992 and later became a research faculty with the University of New Mexico. During the 90s he was involved in development of a several electrochemical biosensor technologies for biomedical, environmental food safety and defense applications. In 1999 Plamen Atanasov joined Superior MicroPowders LLC (now Cabot-SMP) where he was a project leader in fuel cell electrocatalysts development that resulted in introduction of spray pyrolysis for catalyst synthesis on industrial scale. He returned to the University of New Mexico in 2000 as faculty member of the Chemical and Nuclear Engineering Department. In October 2007 Plamen Atanasov founded the UNM Center for Emerging Energy Technologies and was its Director till December 2011. He has standing collaborations with scientists from LANL, SNL, NREL, ANL, ORNL, LBNL and funded programs with industrial partners such as: Toyota, Daihatsu, Ballard, AFFCC, Sharp, Cabot, IRD, CFDR and Lynntech. Plamen Atanasov's research programs include development of non-platinum electrocatalyst for fuel cells, new materials and technologies for micro-power sources, enzymatic bio-fuel cells, sensor systems design and integration of micro-analytical systems. Starting January 2012 Plamen Atanasov serves as an Associate Dean for Research of the UNM School of Engineering while continuing his research leadership of a research group and supports multiple collaborations.