

PREFACE

Coal contains a trace level of mercury of ~ 0.1 ppm. Mercury is a neurotoxin, and can travel long distances once emitted through the stacks of coal-burning power plants. Approximately 52% of the electricity in the US is generated through the combustion of coal. Coal is an abundant resource in the US – the US has a supply for at least 200 years. The challenge is to utilize the abundant domestic coal for energy independence in environmentally-friendly ways.

With the United States Environmental Protection Agency's Clean Air Mercury Rule recently rescinded by the courts and currently under reconsideration by the agency, and many states promulgating their own regulations, the need exists for low-cost mercury removal techniques that can be applied to coal-burning power plants. Gasification is also an important strategy for increasing the utilization of abundant world coal reserves in a clean and environmental-friendly manner. High-temperature capture of the trace elements mercury, arsenic and selenium helps preserve the high thermal efficiency of integrated gasification combined cycle (IGCC) plants *versus* low-temperature capture by activated carbons. With many states in the USA promulgating regulations for mercury control, the need exists for inexpensive mercury removal techniques that can be applied to both IGCC and coal-burning power plants.

With encouragement from Professor Mercedes Maroto-Valer of the University of Nottingham and the ACS Division of Fuel Chemistry, Professor Radisav D. Vidic of the University of Pittsburgh, Dr. Yinzhi Zhang of Sorbent Technologies, and I chaired and co-organized the four sessions on "Mercury and Other Trace Elements in Fuel: Emissions and Control" at the joint ACS–AIChE National Meetings held in New Orleans in April 2008.

The four sessions covered the control of the trace elements mercury, arsenic and selenium in coal-derived gas streams, the fate of arsenic and selenium in flue and fuel gas and the online detection of mercury in flue gas. Three eminent keynote speakers representing EPRI (Dr. Ramsay Chang), Reaction Engineering (Dr. Connie Senior) and DOE (Tom Feeley) presented overviews at the sessions. The sessions were sponsored by *Main Group Chemistry*. Over 15,000 people from around the world attended the conference during the week of 5 April 2008 at the New Orleans Convention Center.

This special issue of the journal *Main Group Chemistry* is culled from some of the 29 trace metal papers presented at the four sessions on 'Mercury and Other Trace Elements in Fuel: Emissions and Control' at the joint ACS–AIChE National Meeting. We hope that you will find the papers in this special issue informative and thought provoking.

Evan J. Granite
*National Energy Technology
Laboratory, United States Department of Energy,
Pittsburgh, USA*