

## **Soot induced reduction of Fe(III) and production of H<sub>2</sub>O<sub>2</sub>**

ANNE M. JOHANSEN\*<sup>1</sup>, HECTOR CASIQUE<sup>1</sup>, DAN HINZ<sup>1</sup>,  
ASHLEEN REDDY<sup>1</sup>, JUSTIN RODRIGUEZ<sup>1</sup> AND JUAN  
RODRIGUEZ<sup>1</sup>

<sup>1</sup>Chemistry Department, Central Washington University, 400  
E. University Way, Ellensburg, WA 98926-7539,  
correspondance: \*anne.johansen@cwu.edu

Combustion of fuels leads to the emission of carbonaceous soot particles that contain organic molecules and trace metals. Despite the fact that ferrous iron, Fe(II), and quinone-like structures seem to contribute to soot toxicity, not much is known about (i) how these compounds are produced during combustion and after emission into the atmosphere, and (ii) how they impact the environment and human health. The purpose of this research is to study model iron-soot systems under conditions encountered in the tail pipe, the environment, and cellular systems, in order to increase our understanding of the iron redox processes that control iron speciation and soot reactivity. Wet-chemical and spectroscopic techniques are used to determine iron speciation, H<sub>2</sub>O<sub>2</sub> production and soot characteristics in a variety of settings. Results show that under reducing environments as well as in sunlight, iron is effectively reduced in the presence of soot, and that soot increases the production of H<sub>2</sub>O<sub>2</sub> in the presence of biologically and environmentally relevant organic electron donors.