

# Analytical & Bioanalytical Techniques

September 28-30, 2016 Orlando, USA

## Understanding the transformation pathways of atmospheric aerosols: Some revelations from analytical chemistry techniques

**Song Gao**

Stetson University, USA

The detailed chemical composition of atmospheric aerosols plays a key role in understanding their impact on the climate system, yet this information is still poorly understood due to the complicated molecular identity and transformation pathways involved. In addition, aerosol chemistry involved in urban smog pollution also requires detailed analytical characterization. This talk discusses how some analytical techniques can yield insights on aerosol chemical composition. In the laboratory, reactions among carbonyls and amines, common pollutants in urban areas were carried out to verify the validity of the Mannich reaction in the urban atmosphere. Gas Chromatography-Mass Spectrometry analyses indicate that Mannich-type products form under common acidity and temperature conditions, consistent with ambient observations and proposed mechanisms. In a separate case involving long-range transport, size-resolved aerosol samples were collected in the Caribbean. Meteorological and chemical analyses, utilizing atomic absorption, show that these aerosols frequently had their origins in African desert and carried mineral elements to enrich the soil in the Caribbean. In addition, dust and black carbon were distributed in coarse and fine aerosol particles, respectively, due to their different sources and evolution pathways. Novel analytical techniques are needed to further unravel the unknown species in atmospheric aerosols and their roles in climate and pollution studies.

### Biography

Song Gao is currently an Associate Professor of Chemistry at Stetson University in Florida, USA. He has received his PhD in Chemistry from the University of Washington and Postdoctoral training on Atmospheric Chemistry at California Institute of Technology (Caltech). He has received research grants from the US National Science Foundation (NSF) and Hong Kong Research Council. He has published peer-reviewed papers on the topics of aerosol chemistry and air pollution, ground water remediation and climate mitigation in reputed international journals. He has served on review panels at NSF and as Referees for many scientific journals and is currently an Associate Editor for the *Journal of Environmental Studies and Sciences* (Springer).

sgao@stetson.edu

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