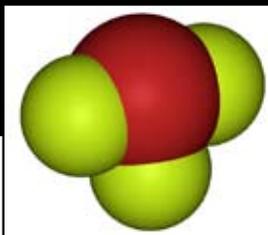




"We came to the CLS with problems... and now they're solving them with us."



New Layers of Knowledge at Mosaic Belle Plaine

The Mosaic Belle Plaine plant is a world-wide agricultural and industrial potash supplier. For the last two years, they sponsored Dr. Thava Pushparajah as a staff scientist at the CLS to conduct industry-related research.

Mosaic's Research Chemist Shawn Gilbert is enthusiastic about his experience working with the CLS: "It's a spectacular tool—I knew nothing about it when I started, but the CLS team helped me learn what I needed to know. We came to the CLS with problems. They got up to speed on our problems, and now they're solving them with us."

Mosaic's primary problem involved their need to develop a better understanding of the chemistry involved in their potash processing. The company developed a novel precipitation process to separate bromine from its potash brine solutions. While scientists had hypothesized about how the addition of an oxidant under alkaline conditions would cause the precipitation of bromine, they had not yet determined the actual mechanism behind the reaction.

Using X-ray absorption spectroscopy, Dr. Pushparajah mapped chemical pathways that occur during bromide precipitation in order to observe what happens at every stage of the process. The studies were successful, providing Mosaic with an improved

understanding of the process that occurs in their brine solution.

Not only do the findings allow Mosaic to understand their precipitation process, they also offer potential for the characterization of bromine in other industrial and environmental samples. The team has added information to the overall knowledge base regarding the formation of bromine complexes, which could be used to study the stability of the precipitates, including how they can be stored, and any special treatment that is required. In a second project, the CLS worked with Mosaic to develop a better understanding of a proprietary technique that could offer improved efficiency in processing methods.

The benefits of Mosaic's partnership with CLS have been two-fold. Key to maintaining an edge over the competition, Gilbert notes that understanding Mosaic's processes on a molecular or atomic level is "where we need to be to be competitive. We're not developing processes based on trial and error. We're making improvements based on data. We've got a more thorough understanding of what we're working with."

CLS scientists have also provided invaluable education to Mosaic's scientists. Gilbert remarks, "It was great to have Jeff Cutler, Tom Kotzer and other scientists there to provide support and a true understanding of the synchrotron's capabilities. They're very helpful and knowledgeable." Gilbert looks forward to finding new problems for the Lightsource team to solve.

Shawn Gilbert,
Mosaic Research
Chemist.

