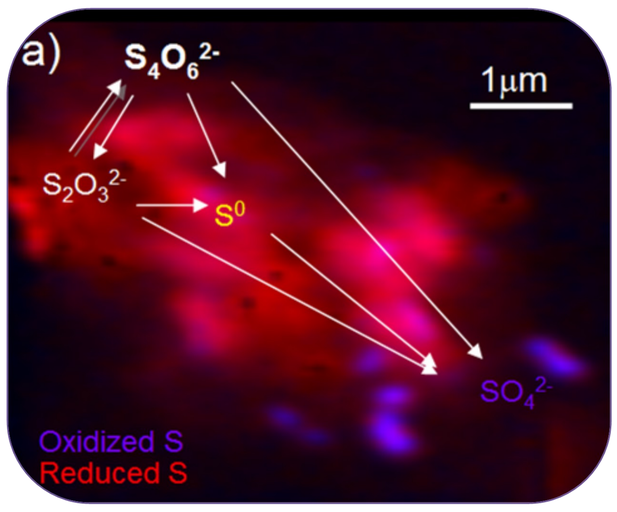
Remediation and Exploration



Pulling the Plug on Acid Mine Drainage

Acid Mine Drainage (AMD) is caused when sulphur in mine tailings reacts with water and oxygen in the environment to produce sulphuric acid. It is a major environmental concern due to its contributions to lake acidification and its effects on water quality. In addition, the sulphuric acid dissolves carbonate minerals in the underlying rock, releasing carbon dioxide into the atmosphere. Using the CLS, researchers from McMaster University have found that two species of bacteria isolated from a mine tailings pond in Northern Ontario work together to limit the amount of sulphuric acid produced by sharing the sulphur in the tailings as an energy source.

DOI: 10.1021/es803616k

Acid Rain on the Northern Forests

Research by high school students using the CLS may change how the impact of acid rain is measured on forest soil. While studying the effects of nitric acid on soils from Saskatchewan's boreal forest, the students found that the acid's effects vary in individual layers of soil. The findings raise questions about current environmental standards that are based on measurements from bulk soil samples, leading some researchers to consider reassessing their standards. The students are continuing their research using soil samples from several locations in Northern Saskatchewan, including areas downwind of the Athabasca oil sands neighbouring Alberta.

http://www.lightsource.ca/science/pdf/activity_report_2009/83.pdf

Tracking Selenium in the Wetlands

Selenium is a by-product of coal mining which can accumulate in the food chains of environments exposed to elevated levels. Egg-laying animals, such as fish, amphibians and birds are most susceptible to high levels of selenium.
Alan Martin, of Lorax Environmental Services Ltd. is using the CLS to assess the behaviour of selenium in the wetlands of the Elk River Valley of British Columbia. Martin's research has helped determine where Selenium is stored in wetland systems, and in what forms. This information is key when determining methods of effective bio-remediation that have a minimal impact on wildlife.

http://www.lightsource.ca/industry/pdf/CLS_Casestudy_LORAX.pdf

Collaborating for the World's Uranium Future

Certain chemical elements in uranium mine tailings pose a potential risk to the environment, so much so that the Canadian Nuclear Safety Commission mandates their long-term behaviour be characterized for time periods of 10,000 years and longer. To adequately evaluate this, Cameco Geoscientists teamed up with U of S professors to use the CLS to assess the fate and transport of potential contaminants from the tailings. Only the high-energy beamlines at synchrotrons such as the CLS have proven sensitive enough to characterize these elements. Given the immense time scale and the possibility for unexpected change, the researcher's aim is to limit the adverse possibilities for the future.

http://www.lightsource.ca/industry/pdf/Cameco.pdf

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