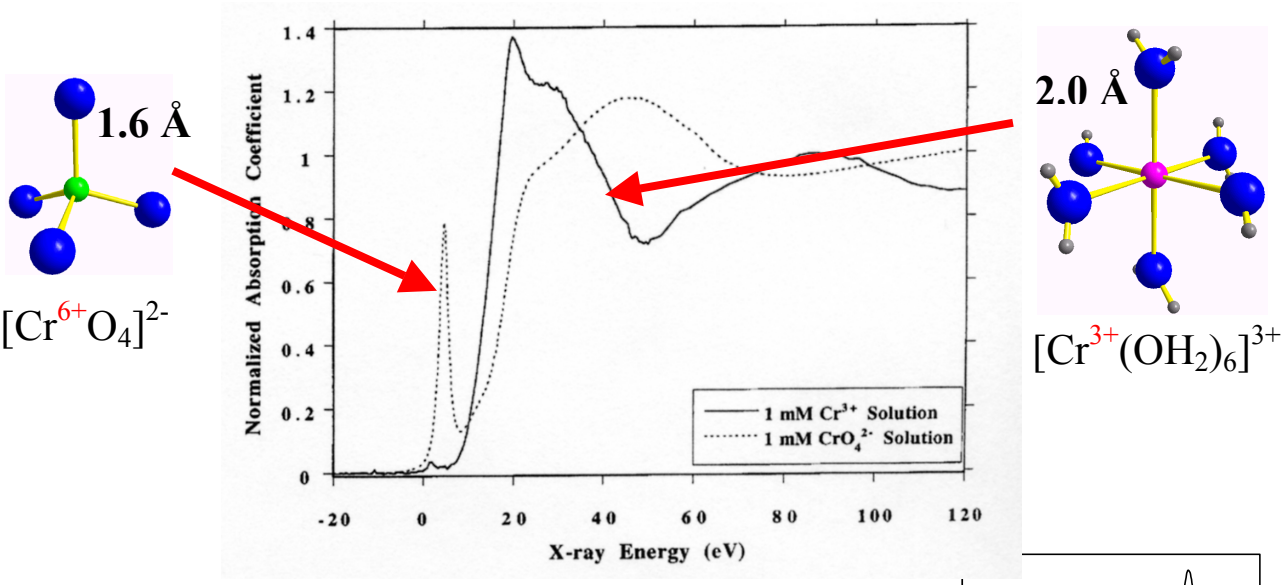
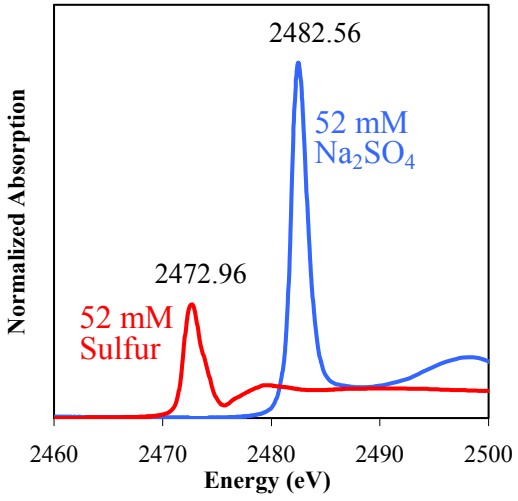
X-ray Absorption Near Edge Structure (XANES) Spectroscopy

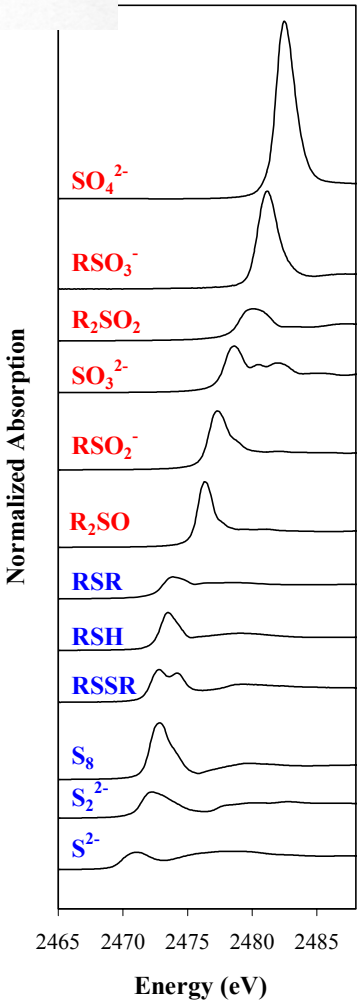
The near edge structure of an x-ray absorption spectrum is sensitive to the coordination and oxidation state of the absorbing atom. For example, the XANES region of 1 mM Cr^{3+}(aq) and 1 mM $[Cr^{6+}O_4]^{2-}$ (aq) are very different (*ref:* M. Lytel, *et al.*, *Plant*, **1998**, *206*, 293-299).



Sulfur has a rich XANES structure, with a 13 eV shift from S(-II) in sulfide to S(+VI) in sulfate. For many elements, such as sulfur, chromium, selenium, arsenic, …, the near edge structure of an XAS spectrum allows characterization of the chemical forms of the absorbing element in nearly intact sample.

Comparison between the XANES spectra of equi-molar solutions of elemental sulfur in *p*-Xylene, and Na_2SO_4 in water.





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