

Photolysis of SO isotopologues

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The fractionation of sulphur isotopes in samples of Archaean era sediment is complicated and mass-independent. The possibility of atmospheric photochemistry contributing to this fractionation, along with atmosphere-surface coupling and sedimentation, is being actively investigated [1]. The photolysis of SO is certainly a significant process in the ultraviolet-rich atmosphere of that era but is difficult to quantify experimentally due to the radical nature of the molecule. This is particularly true with respect to the fine spectroscopic details that underlie isotope-dependent photolysis. Existing theoretical and experimental studies of this system [2,3] are informative but may be unreliable where isotope-dependent perturbations and line broadening involve the interaction of multiple excited states.

To address these issues, we have measured photoabsorption cross sections of the $B - X$ system in ^{32}SO , ^{33}SO , and ^{34}SO . I will present results on the relative cross sections, perturbation, and line broadening of these species, and their potential for photolytic mass-independent fractionation in the atmosphere.

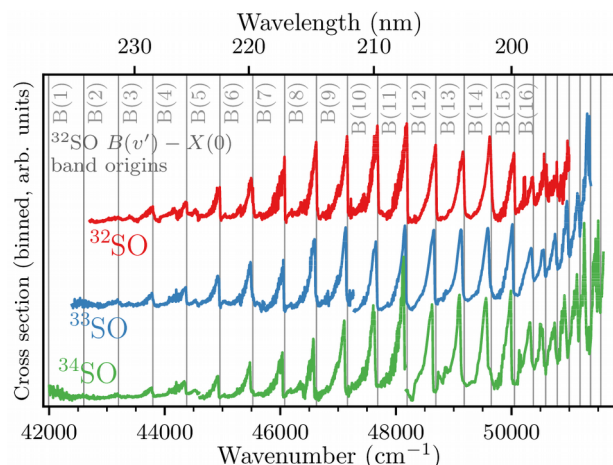


Figure: Experimental absorption cross section of SO isotopologues.

[1] Farquhar, Bao & Thiemens (2000), Science 289, 756.

[2] Danielache et al. (2014), J. Chem. Phys. 140, 044319.

[3] Liu, Elliot, et al. (2006), J. Mol. Spectr. 238, 213.

