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Ultraviolet Spectroscopy of ^{32}S, ^{33}S, ^{34}S and ^{36}S Sulphur Dioxide: Absorption Cross Sections in the 250-330 nm and the isotopic fractionations of the SO_2* reaction.

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We present the measurement of the ultraviolet absorption cross sections of $^{32}SO_2$, $^{33}SO_2$,$^{34}SO_2$ and the first measurements of the $^{36}SO_2$ isotopologue recorded between 40,000 and 30,300 cm^{-1} (250 to 330 nm) at 293 K with a resolution of 8 cm^{-1}. The measured spectrum replicates our previous data and also spectra in the literature for the ^{32}S isotopologue. The main source of error is the standard deviation of the measurements themselves while the root-mean-square of other sources of error is in average less than 10%. The rich vibrational structure and the positions and widths of the peaks change with isotopic substitution in a complex fashion but reproduces our previously published measurements.

The results imply that the total accumulated energy of the formed SO_2* fragment is not mass dependent and therefore the subsequent chemistry may produce previously unexpected mass independent fractionations.