

Accepted Manuscript

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PII: S0301-0104(16)30470-0

DOI: <http://dx.doi.org/10.1016/j.chemphys.2016.10.002>

Reference: CHEMPH 9691

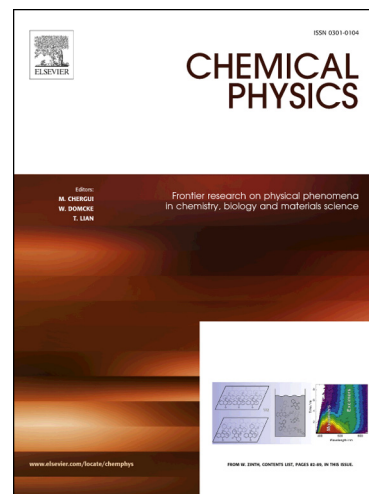
To appear in: *Chemical Physics*

Received Date: 10 June 2016

Accepted Date: 1 October 2016

Please cite this article as: D.M.P. Holland, D.A. Shaw, A study of the valence shell absolute photoabsorption, photoionisation and photodissociation cross sections and the photoionisation quantum efficiency of carbonyl sulphide, *Chemical Physics* (2016), doi: <http://dx.doi.org/10.1016/j.chemphys.2016.10.002>

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A study of the valence shell absolute photoabsorption, photoionisation and photodissociation cross sections and the photoionisation quantum efficiency of carbonyl sulphide

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Abstract

The absolute photoabsorption, photoionisation and photodissociation cross sections and the photoionisation quantum efficiency of carbonyl sulphide have been measured using a double ion chamber and synchrotron radiation in the energy range from the ionisation threshold to 24 eV. In addition to the absorption bands associated with well established Rydberg series, some previously unassigned features have been tentatively attributed to an f-type Rydberg series converging onto the $\tilde{B}^2\Sigma^+$ state ionisation threshold. Structure appearing in the photodissociation spectrum has been correlated with that observed in earlier fluorescence yields for emission, due mainly to the CS photofragment, occurring between 160 and 300 nm. The photoionisation quantum efficiency reaches a plateau value close to unity for energies above ~16 eV. The predissociation of Rydberg states into neutral fragments does not appear to affect the photoionisation quantum efficiency of carbonyl sulphide to the extent that is commonly observed in other small molecules. A sum rule analysis has been carried out by combining the present absolute photoabsorption measurements with similar data covering the remaining energy regions.

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