

Si₂O₂⁺ - PHOTODISSOCIATION AND OPTICAL ABSORPTION PROPERTIES

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Interstellar dust consists mainly of μm -sized silicate particles. Their origin and evolutionary development processes are still poorly understood. So far, only molecular SiO as a possible precursor has been observed and identified in a circumstellar disk [1]. We present experimental data and quantum chemical calculations of absorption and dissociation properties of Si₂O₂⁺ clusters. These cations represent possible intermediates between the circumstellar diatomic SiO molecule and the silicate grains observed in the interstellar medium. These optical spectra provide the first spectroscopic information for any Si_nO_m⁺ cation larger than SiO⁺. These spectra are the first optical absorption spectra of Si₂O₂⁺ cations. We were able to obtain those by photodissociation spectroscopy of mass-selected ions in a tandem mass spectrometer coupled to a laser vaporization source [2]. Here, the experimental results will be compared with TD-DFT calculations and discussed in an astrophysical context.

Literature:

- [1] R. Wilson et al., *Astrophys. J.*, 1971, 167, L97.
- [2] M. Förstel et al., *Rev. Sci. Instrum.*, 2017, 88, 123110.