GLOBAL ANALYSIS OF SEVERAL BANDS OF THE CF_4 MOLECULE

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Carbon tetrafluoride is a powerful greenhouse gas, mainly of anthropogenic origin. Its absorption spectrum is, however, still badly modeled, especially for hot bands in the strongly absorbing ν_3 region. To overcome this problem, we have undertaken a systematic study of all the lower rovibrational transitions of this molecule. In particular, new far-infrared spectra recorded at the SOLEIL Synchrotron facility give access to bands implying the "forbidden" modes ν_1 and ν_2 which have only been investigated previously thanks to stimulated Raman spectroscopy[a], that is with a lower accuracy and much less data. Combined with the previous analyses performed in our group[b], we thus report here a new global fit of line positions of CF_4 by considering several transitions altogether: ν_2, $2\nu_2 - \nu_2$, ν_4, $2\nu_4$, ν_3 and $\nu_3 - 2\nu_2$. This gives a consistent set of molecular parameters that will be of great help for the analysis of hot bands like $\nu_3 + \nu_2 - \nu_2$. A second separate global fit including the ν_1, $\nu_1 - \nu_4$ and $2\nu_1 - \nu_1$ bands will also be presented.

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[a] V. Boudon, D. Bermejo, R. Z. Martínez, J. Raman Spectrosc. **44**, 731?738 (2013).

[b] V. Boudon, J. Mitchell, A. Domanskaya, C. Maul, R; Georges, A. Benidar, W. G. Harter, Mol. Phys. **109**, 17–18 (2011).