The isotropic remnant of the CO2 near-fully depolarized Raman 2v3 overtone

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Titre	The isotropic remnant of the CO2 near-fully depolarized Raman 2v3 overtone
Type de publication	Article de revue
Auteur	Chrysos, Michel [1], Verzhbitskiy, I.-A. [2], Rachet, Florent [3], Kouzov, A.-P. [4]
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Résumé en anglais	In a recent paper [M. Chrysos, I. A. Verzhbitskiy, F. Rachet, and A. P. Kouzov, J. Chem. Phys. 134, 044318 (2011)], we showed that, in CO2, the 2 nu(3) transition generates a Raman line spectrum that is 98% depolarized, a property in agreement with general symmetry rules. Here, we present an extensive analysis, experimental and theoretical, of the isotropic remnant of this overtone. The isotropic spectrum turned out to be 45 times less intense than its anisotropic counterpart and to have a moment that is 350 times smaller than the moment of the anisotropic spectrum, in excellent agreement with theoretical predictions. Once the measured intensity (along with other data exclusively experimental) was fed back into the formula of the moment, a value for the CO2 mean-polarizability asymmetric stretch derivative partial derivative(2)(alpha) over bar/partial derivative q(3)(2) was returned that matches the best ab initio prediction to better than 4%. Agreement, in order of magnitude, was found between the intensity reported herein and that reported in the sole prior study of this overtone [G. Tejeda, B. Mate, and S. Montero, J. Chem. Phys. 103, 568 (1995)]. (C) 2011 American Institute of Physics. [doi:10.1063/1.3557820]
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