

New millimetre-wave study of the NH₃-CO van der Waals complex

L. A. Surin^{a,b}, A. A. Dolgov^b, A. Potapov^a, V. A. Panfilov^b, and S. Schlemmer^a

^a I. Physikalisches Institut, University of Cologne, Germany, E-mail: surin@ph1.uni-koeln.de

^b Institute of Spectroscopy RAS, 142190 Troitsk, Moscow, Russia

The pure rotational spectra of the van der Waals complex, NH₃-CO, have been measured using the intracavity OROTRON jet spectrometer in the frequency range of 110-150 GHz. The observed transitions correlated with the rotationless $j_{\text{NH}_3} = 0$ state (*A*-symmetry) of free *ortho*-NH₃ and $j_{\text{NH}_3} = 1$ state (*E*-symmetry) of free *para*-NH₃. For *ortho*-NH₃-CO the $K = 2$ state was detected for the first time by observation of the $K = 2 - 1$ subband (K is the projection of the total angular momentum J on the intermolecular axis) connecting the $(j_{\text{NH}_3}, j_{\text{CO}}) = (0, 1)$ and $(0, 2)$ free rotor states. For *para*-NH₃-CO the $K = 0 - 1$ subband connecting the $(j_{\text{NH}_3}, j_{\text{CO}}) = (1, 0)$ and $(1, 1)$ free rotor states was detected. Other new observed and assigned transitions of NH₃-CO are continuations to higher J values of transition series observed previously at lower frequencies [1].

Both new data sets were analyzed together with known infrared, millimeter-wave and microwave transitions in order to determine the molecular parameters of the NH₃-CO complex in the both *A* and *E* states. A comparison of derived parameters with those of the recently studied CH₄-CO complex [2] is also presented.

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[1] C. Xia, K. A. Walker, and A. R. W. Mckellar, *Mol. Phys.* **2001**, *99*, 643.

[2] A. V. Potapov, A. A. Dolgov, V. A. Panfilov, L. A. Surin, S. Schlemmer, *J. Mol. Spectrosc.* **2011**, *268*, 112.