Investigation of the excited electronic KCs states studied by polarization labeling spectroscopy

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The heteronuclear KCs molecule belongs to the least known alkali diatomics. Till the late 1990s the sole semi-empirical characteristics of KCs consisted in some ground state spectroscopic constants estimated by interpolation from the corresponding experimental values of K_2 and Cs_2. Also among theoreticians, the interest in KCs was very limited. The rapid development of cold physics in the past two decades brought heteronuclear alkali diatomics, with KCs among them, into wider attention, particularly because of their permanent electric dipole moments. New trends have inspired quantum chemistry calculations first [1], followed by experiments employing modern spectroscopic methods [2,3]. To date, seven electronic states of KCs have been observed experimentally: the ground state and six excited states extending up to about 18500 cm^{-1} above the bottom of the ground state potential energy curve.

In our work we investigate excited electronic states of KCs molecule, dissociating to the K(4S) + Cs(5D) and K(3D) + Cs(6S) asymptotes, within the excitation energy range 18000 - 21000 cm^{-1}. The molecular states of KCs should be described rather in Hund's case (c) than Hund's case (a), what makes possible to observe transitions to nominally forbidden states and therefore increases the number of observed states. In this contribution we present first description of selected electronic states in the energy region mentioned above, using the Dunham expansion. Results are compared with theoretical calculations [4].

References

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