OBSERVATION OF LUMINESCENCE SPECTRA OF KrD RYDBERG MOLECULE AT LOW (40K) TEMPERATURE

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The luminescence spectra of KrD Rydberg molecule in spectral range from 400 nm to 800 nm in gas phase at low temperatures (40K) were observed for the first time by means of original experimental technique. In this method two gas jets were intersected over the surface of superfluid helium (temperature 1.5K, pressure of helium vapor 10 torr). Gas mixture of He with 1-5frequency electrodeless discharge. The resulting luminescent jet was introduced in a helium cryostat and crossed by a stream of H_2 or D_2 molecules to produce RgH or RgD. First experiments with Kr and D_2 were carried out. A number of bands observed in the luminescence spectra were assigned to KrD extensively studied by Dabrowski et al. [a]. The most pronounced bands observed at 515 nm and 773 nm originate from 4d state and correspond to transitions to 5p states. Transitions from the np complexes were also identified but their intensity were much weaker. Near 483 nm there was rather broad band assigned to transitions from nf complexes. The luminescence spectra of nitrogen molecules and ions, and CN radicals at such low temperatures were also studied and a number of peculiarities in the spectra were observed. These results will be presented as well.

[a] I. Dabrowski, D. A. Sadovskii, Molecular Physics, 81(2), 291, (1994).