FOURIER TRANSFORM EMISSIN SPECTRUM OF THE NeH RYDBERG MOLECULE.

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Rare-gas hydrides have repulsive ground electronic states with only shallow van der Waals minima and stack of bound Rydberg states, also called as Rydberg molecules. Although bound-bound as well as bound-repulsive spectra of HeH, ArH, KrH and XeH have been observed and analyzed extensively, the situation for NeH is different. In 1988, Kettle and Walther[c] reported the observation of bound-bound emission spectrum of NeH, where three discrete spectral features around 14600, 12910 and 11780 cm^{-1} were assigned to NeH. Since then, no analysis and no further observation for NeH have been obtained. Several ab initio and quantum defect calculations were performed on NeH, trying to assign the observed spectrum to the individual Rydberg states of NeH. Recently, new rotation-vibration emission bands of NeH^+ in the 1700-3900 cm^{-1} region were observed[d] with Fourier transform spectrometer (Bruker IFS 120HR) in Okayama University. In the similar DC glow discharge of Ne/H_2 mixture, the strong emission band of NeH around 12910 cm^{-1} which was observed previously by Kettle and Walther with resolution $\sim$10 cm^{-1} was recorded again with much higher resolution (0.05cm^{-1}). In addition, several new emission features in the 7000 cm^{-1} region were observed in the same discharge and assigned to the bound-bound transitions of NeH. The discrete feature around 7600 cm^{-1} showed some regular spectral pattern, which may lead us to analyze the spectrum of NeH.

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[c]W. Kettle and H. Walther, *Chem. Phys. Lett.* **146**, 180 (1988).

[d]S. Civis *et al. J. Mol. Spectrosc.* **210**, 127 (2001); *J. Mol. Struct.* **695**, 5 (2004).