EXCITATION OF THE SECOND POSITIVE BAND SYSTEM OF NITROGEN IN THE PRESENCE OF HYDROGEN OR SODIUM VAPOR

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ABSTRACT

A number of bands observed by Wright, Geil, and Anderson in a discharge tube containing hydrogen and sodium vapor were definitely shown to belong to the second positive group of nitrogen bands.

The intensities of the nitrogen bands of the second positive group were studied in various mixtures of nitrogen and hydrogen at pressures ranging from 0.01 mm. to 1.0 mm. With pure nitrogen in the discharge tube the intensities of the bands increased with increasing pressure until a pressure of about 0.15 mm. was reached. A further tenfold increase in the pressure caused practically no change in the band intensities. With a partial pressure of nitrogen of 0.01 mm. an increase of the hydrogen partial pressure from 0.1 to 0.5 mm. greatly enhanced the nitrogen bands. With a partial pressure of nitrogen of 0.025 mm. or higher the presence of hydrogen had practically no effect upon the intensities of the bands. No influence of the presence of hydrogen upon the intensity distribution among or within the individual bands was detected.

The so-called third positive group of nitrogen bands, lying between 2000 and 3000 A and due to NO rather than to than to N_2, appeared when the partial pressure of nitrogen was 0.2 mm. or greater. A few of the CN bands appeared with low intensity when nitrogen was used in the discharge tube.

The presence of sodium, potassium, or mercury vapors had apparently no effect upon the intensities of the bands of the second positive group. An effect of the alkali metals upon the intensity distribution among the bands, indicated by Anderson's results, was not substantiated.

A number of lines measured by Anderson and listed by him as lines of unknown origin were identified as lines of the spectra of nitrogen, hydrogen, potassium, nickel, cobalt, and oxygen.