

COLOR-CENTER LASER SPECTROSCOPY OF THE ν_{12} BAND OF BENZENE
OBSERVED WITH THE PULSED SUPERSONIC-JET EXPANSION

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The rotationally resolved high-resolution spectra will be essential to understand the intramolecular vibrational redistribution (IVR) of aromatic molecules especially in the highly excited CH-stretch vibrations. We developed a color-center laser spectrometer combined with a pulsed supersonic-jet expansion technique and applied it to observe the absorption spectrum of the $\nu_{12}(e_{1u})$ band of benzene at 3047.9 cm^{-1} . Although the *Q*-branch lines were still overlapped, the *P*- and *R*-branch lines near the band origin, with *J* and *K* quantum numbers up to 15, were observed well resolved, thanks to the rotational cooling in the jet. The rotational temperature in the jet was estimated to be 4-9 K from the observed line intensities. The rotational temperature showed strong *J*-dependence, whereas those for the various *K*-stack were almost identical indicating the freezing between *K*-stacks scarcely occur in the present experimental condition. The molecular constants derived are consistent with the more accurate result by continuous molecular beam experiment with bolometer detection ^a.

^aJ. L. Domenech, M-L. Junttila, and A. S. Pine *J. Mol. Spectrosc.* 149, 391 (1991)