

Lawrence Berkeley National Laboratory

Recent Work

Title

DIPOLE MOMENTS OF SOME ALKALI HALIDE MOLECULES BY THE MOLECULAR BEAM
ELECTRIC RESONANCE METHOD

Permalink

<https://escholarship.org/uc/item/502466dc>

Authors

Hebert, A.J.

Lovas, F.J.

Melendres, C.A.

et al.

Publication Date

1967-11-01

eg. 2

University of California
Ernest O. Lawrence
Radiation Laboratory

DIPOLE MOMENTS OF SOME ALKALI HALIDE MOLECULES
BY THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD

A. J. Hebert, F. J. Lovas, C. A. Melendres,
C. D. Hollowell, T. L. Story, Jr., and K. Street, Jr.

November 1967

RECEIVED
LIBRARY
DOCUMENT

TWO-WEEK LOAN COPY
This is a Library Circulating Copy
which may be borrowed for two weeks.
For a personal retention copy, call
Tech. Info. Division, Ext. 5545

UCRL-17962
eg. 2

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

Submitted to the Journal of Chemical Physics

UCRL-17962
Preprint

UNIVERSITY OF CALIFORNIA

Lawrence Radiation Laboratory
Berkeley, California

AEC Contract No. W-7405-eng-48

DIPOLE MOMENTS OF SOME ALKALI HALIDE MOLECULES BY THE MOLECULAR BEAM ELECTRIC
RESONANCE METHOD

A. J. Hebert, F. J. Lovas, C. A. Melendres, C. D. Hollowell, T. L. Story, Jr.,
and K. Street, Jr.

November 1967

DIPOLE MOMENTS OF SOME ALKALI HALIDE MOLECULES BY THE MOLECULAR BEAM ELECTRIC
RESONANCE METHOD*

A. J. Hebert, F. J. Lovas, C. A. Melendres, C. D. Hollowell,[†] T. L. Story, Jr.,
and K. Street, Jr.

Department of Chemistry and
Lawrence Radiation Laboratory
University of California
Berkeley, California

November 1967

ABSTRACT

Dipole moments are given for the three lowest vibrational states of
LiF, LiCl, NaCl, NaBr, NaI, KCl, RbF, RbCl, CsF, and CsCl.

Over a period of several years we have made rather accurate measurements of the dipole moments of a number of alkali halide molecules by the molecular beam electric resonance method. Our particular interest in these measurements was largely motivated by attempts to improve^{1,2} the simple ionic model of the gaseous alkali halide molecules, however they may be of some interest for other reasons also.

A description of the apparatus used, the method of reducing the data, and some results for other alkali halides have been published previously;^{3,4,5} so in the interests of economy of space only the results are given here. More detailed accounts of these measurements are available in a series of unpublished University of California Lawrence Radiation Laboratory Reports. Reference to these is given in Table I.

Dipole moments for some of the molecules (NaBr, NaI, and RbCl) have not been reported previously, others represent only some improvement in the accuracy of measurement. Since the principal source of disagreement between dipole measurements made in different laboratories is likely to arise from uncertainties in the value of the Stark field used, we have included in Table I our measurements on LiF and KCl. LiF has been previously measured at Harvard⁶ and KCl has been recently measured at Nijmegen.⁷ A comparison of these results indicates that independent Stark field measurements at Harvard, Nijmegen, and Berkeley are in excellent agreement.

