

A MICROWAVE STUDY OF THREE BROMINE-CONTAINING MOLECULES: CBr_2F_2 , AgBr , and $\text{H}_2 \text{AgBr}$

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In preparation for our FTMW study of the complex between hydrogen and silver bromide, $\text{H}_2 \text{AgBr}$, we have investigated the microwave spectra of our source of bromine, dibromodifluoromethane, CBr_2F_2 . Previous sources of bromine to produce AgBr proved either too damaging to the instrumentation in the long term (Br_2), or did not produce enough AgBr to be useful (CHBr_3). In addition, silver bromide, originally studied by Hoeft, Lovas, Tiemann, and Topping in 1971,^a and remeasured by Evans and Gerry in 2000,^b was remeasured once more. We plan to produce $\text{H}_2 \text{AgBr}$, using laser ablation of a silver rod within a supersonic expansion of an argon carrier gas containing H_2 and CBr_2F_2 . This is part of our ongoing study of hydrogen complexed with metal halides which include $\text{H}_2 \text{CuF}$,^c $\text{H}_2 \text{AgCl}$,^d and $\text{H}_2 \text{AuCl}$.^e These molecules are “models” of the molecular hydrogen storage in the cavities of metal organic frameworks (MOFs).

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