極低温イオントラップ—飛行時間型質量分析計を用いた，イオン錯体の極低温紫外スペクトルの観測

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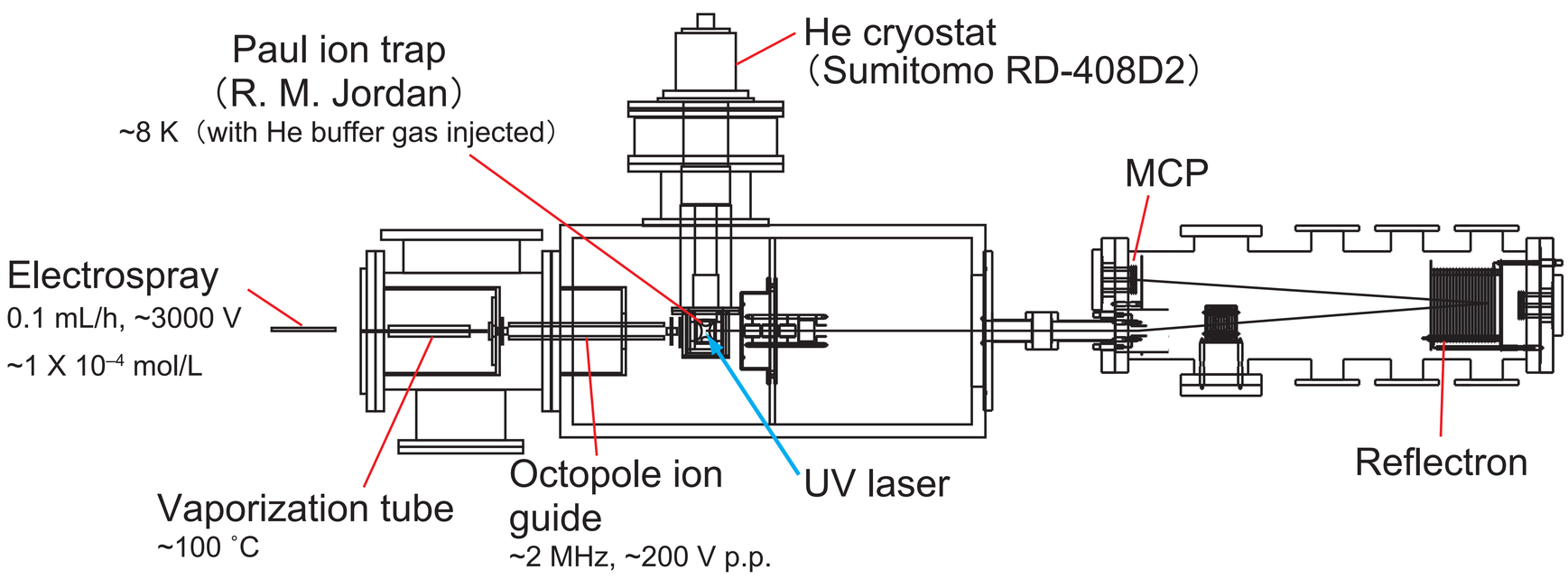
Introduction

■The purpose of this study is to examine spectroscopically the structure of ion complexes for functional molecules such as crown ethers and the relation between the structure and their functions, under cold (~4 K) conditions in the gas phase.

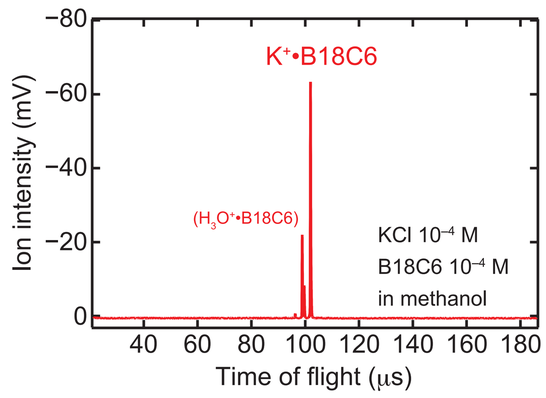
■We have succeeded in constructing a time-of-flight mass spectrometer for UV photodissociation spectroscopy, equipped with an electrospray ion source and a cold Paul ion trap.

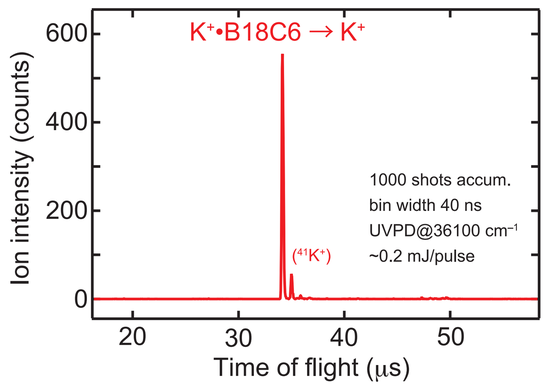
■We demonstrated the application of our apparatus to ion complexes of benzo-18-crown-6, calix[4]arene, and calix[4]resorcinarene.

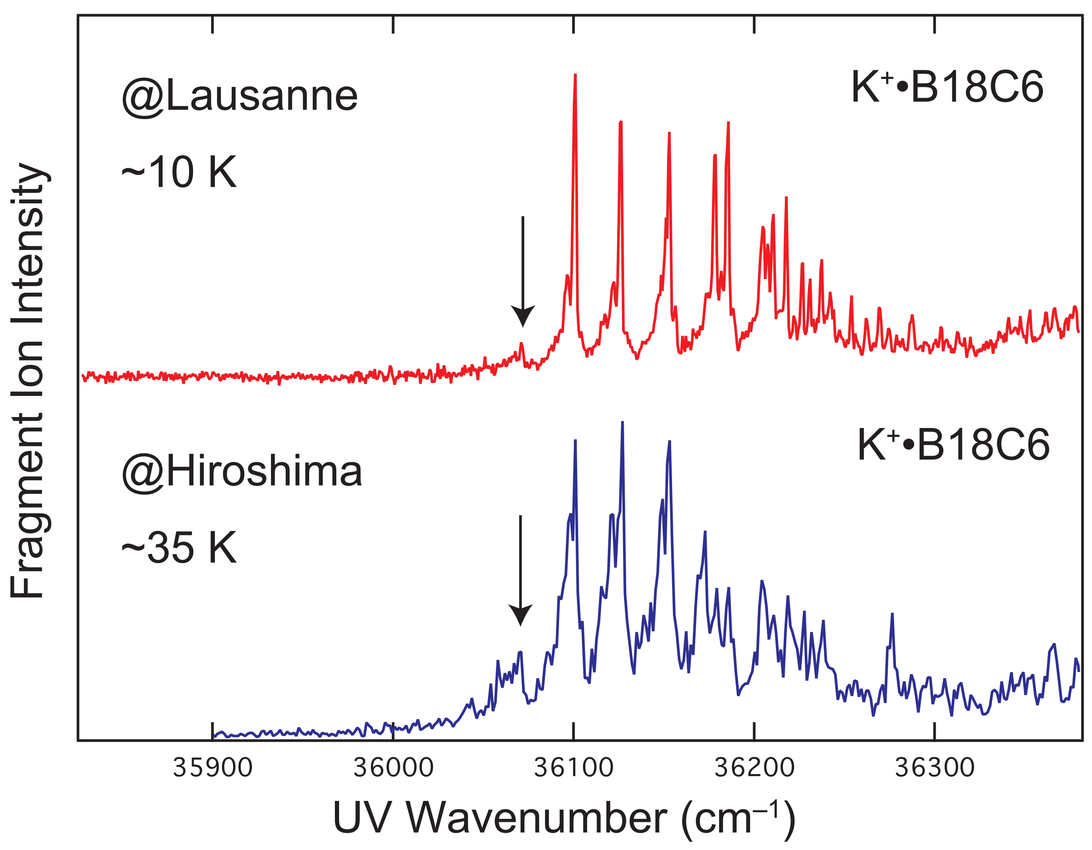
Mass spectrometer for UV photodissociation (UVPD) spectroscopy

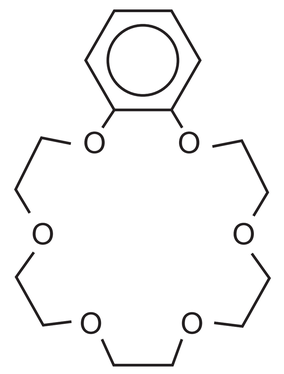


K^+•B18C6 complex





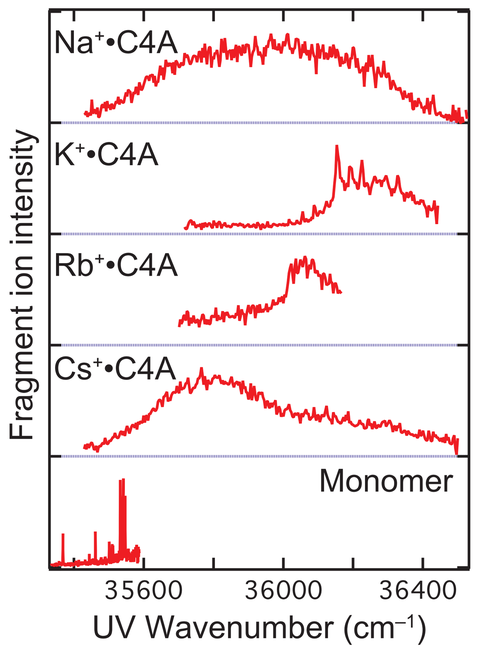


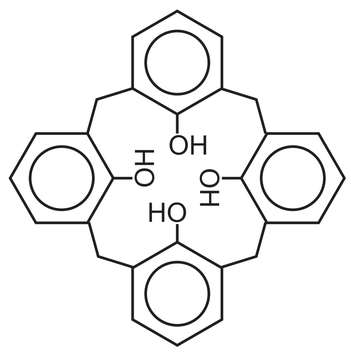


benzo-18-crown-6
(B18C6)

We estimated the ion temperature as ~35 K from the hot band marked by arrows.

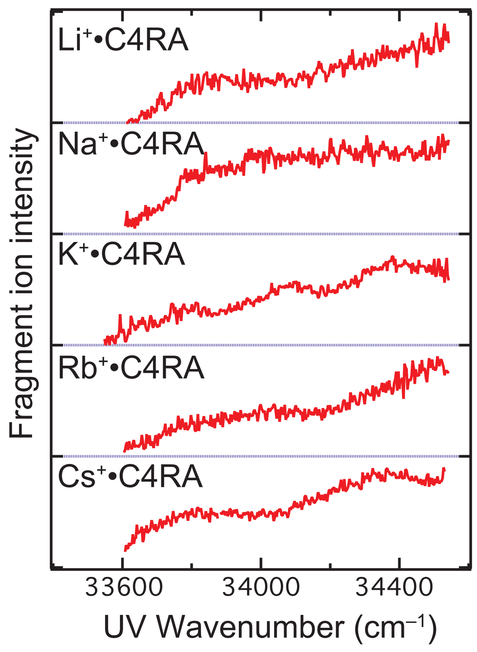
M^+•C4A complexes

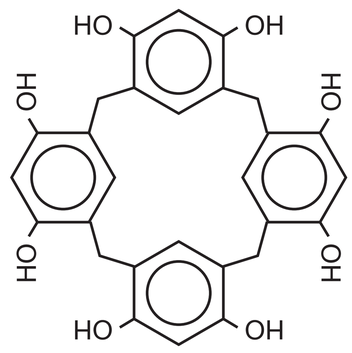




Calix[4]arene
(C4A)

M^+•C4RA complexes





Calix[4]resorcinarene
(C4RA)

■We have to decrease the ion temperature by optimizing the cooling condition.

■For broad applications, mass selection of parent ions is needed.

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