

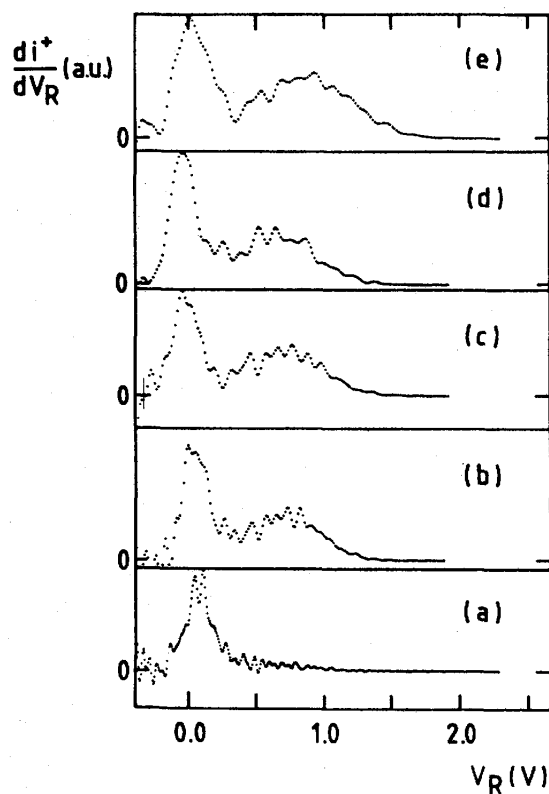
## The Dissociative Photoionization of CH<sub>3</sub>F.

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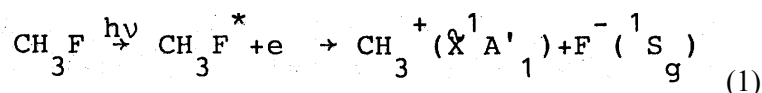
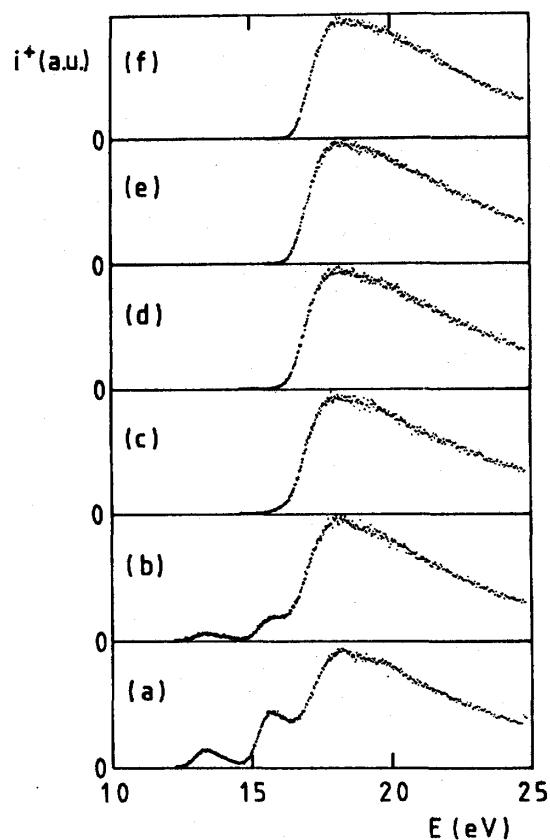
Using synchrotron radiation, dispersed by a 1m-NIM monochromator, the production of CH<sub>2</sub><sup>+</sup>, CH<sub>3</sub><sup>+</sup> and CH<sub>2</sub>F<sup>+</sup> from CH<sub>3</sub>F has been investigated over 10-25 eV photon energy range. The fragment ions are energy-analyzed by a retarding field and mass selected by a quadrupole filter. The photoabsorption curve of CH<sub>3</sub>F has been recorded to enlighten the discussion. For the CH<sub>3</sub><sup>+</sup> ion kinetic energy spectra, as observed at different photon energies, are shown in fig.1. The ionization efficiency curves recorded at different retarding potential settings are displayed in fig.2. The resulting kinetic energy (KE)-vs-appearance energy (AE) diagram is shown in fig.3.

**Fig.1.** KE-spectra of CH<sub>3</sub><sup>+</sup> at (a)16.4eV, (b)17.3eV, (c)18.9eV (d)20.2eV and (e)21.2eV.

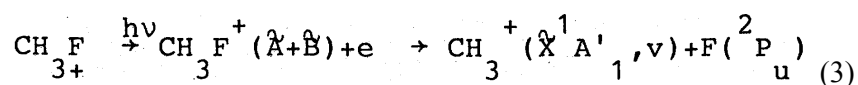


Several processes are observed, i.e. (1)  $(12.45 \pm 0.06)$ eV, (2)  $(14.50 \pm 0.06)$ eV and (3)  $(16.10 \pm 0.06)$ eV respectively. In agreement with earlier work /1-3/, process (1) and (3) are ascribed to dissociative autoionization

Fig.2. PIE curves of  $\text{CH}_3^+$  at  $V_R$  (a)-0.4V, (b)0.19V, (c)0.45V, (d) 0.96V and (f)1.20V.

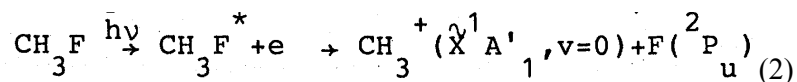


and direct dissociative ionization



where  $\text{CH}_3^+$  carries vibrational and translational energy.

Process (2), not detected earlier by photoionization, is interpreted by dissociative autoionization, i.e.

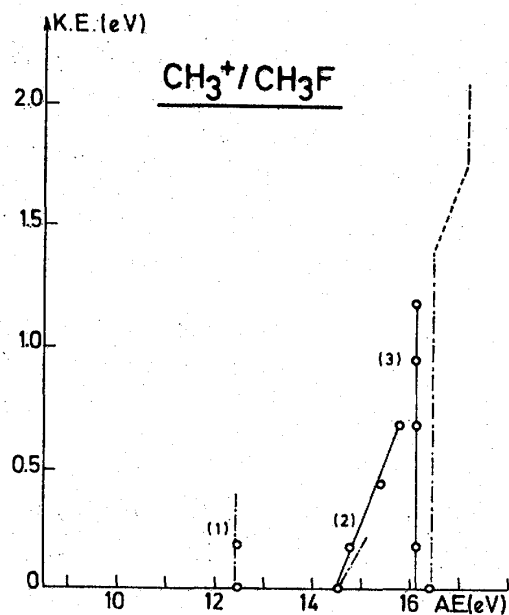


where the excess energy is entirely converted into kinetic energy.

The  $\text{CH}_2^+$  ion, being of low intensity, has been recorded without ion energy analysis.

Three well defined onsets are measured at  $(13.90 \pm 0.06)$  eV,  $(14.63 \pm 0.04)$  eV and  $(22.36 \pm 0.06)$  eV. As for  $\text{CH}_3^+$ , dissociative autoionization is an important process. Beside direct ionization, the same applies to the formation of  $\text{CH}_2\text{F}^+$ .

**Fig.3.** KE-vs-AE plot for  $CH_3^+ / CH_3F$ . Dotted lines represent EI results /3/.



### References

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