PHOTOELECTRON SPECTROSCOPY OF HIGH TEMPERATURE VAPOURS

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Contents :

INTRODUCTION

Electronic structure of compounds in vapor and solid state can be studied by using ESCA

Studies in the vapor phase can be carried out by introducing the sample into the source chamber.

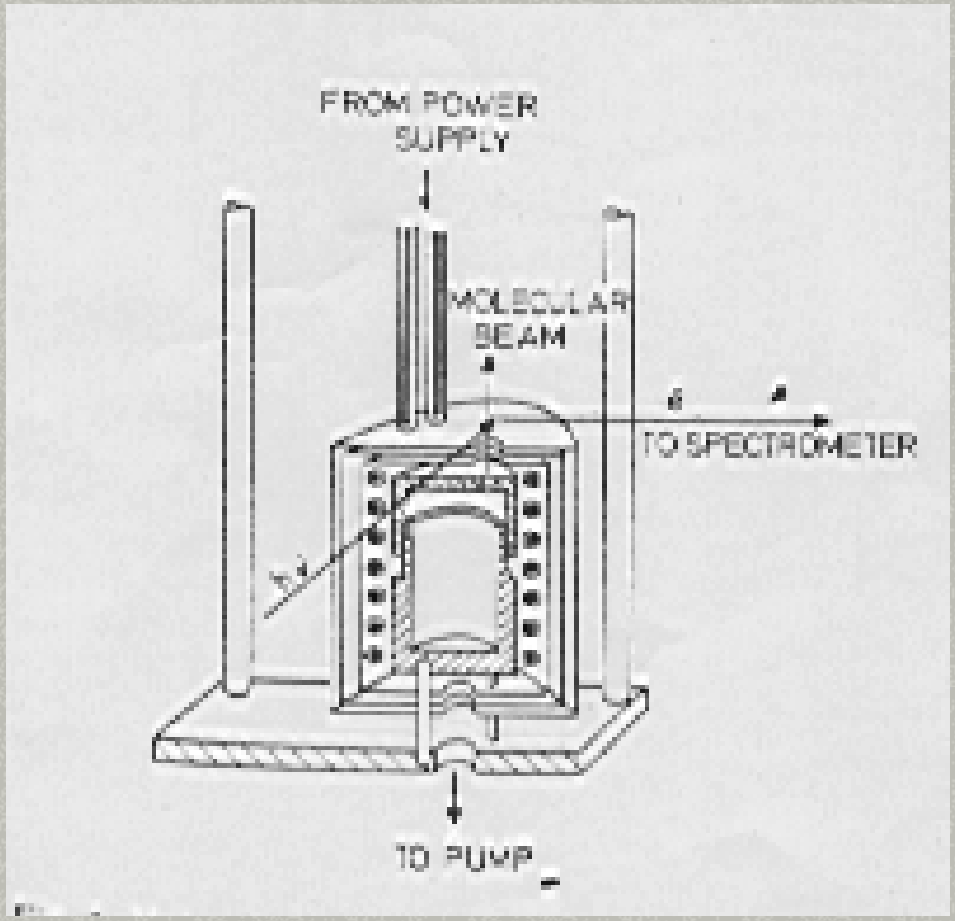
Other method is molecular beam technique.
the density of molecules in these beams is expected to be lower.
When the vapor pressure of the sample is very low, requires high temperatures

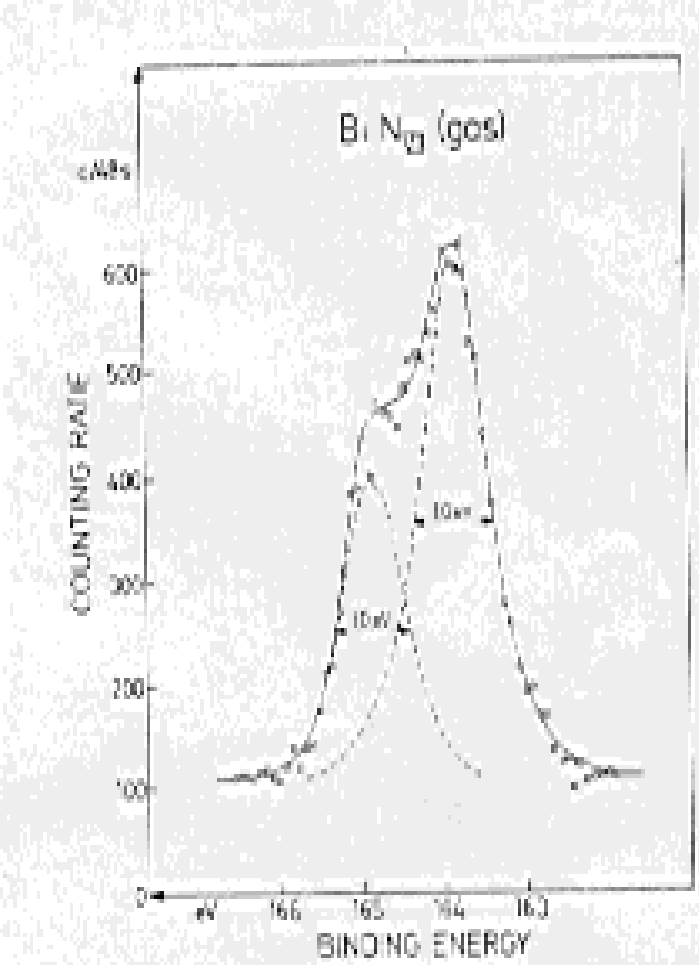
Pyrolysis, dimerization and other chemical reactions and free radicals can be studied

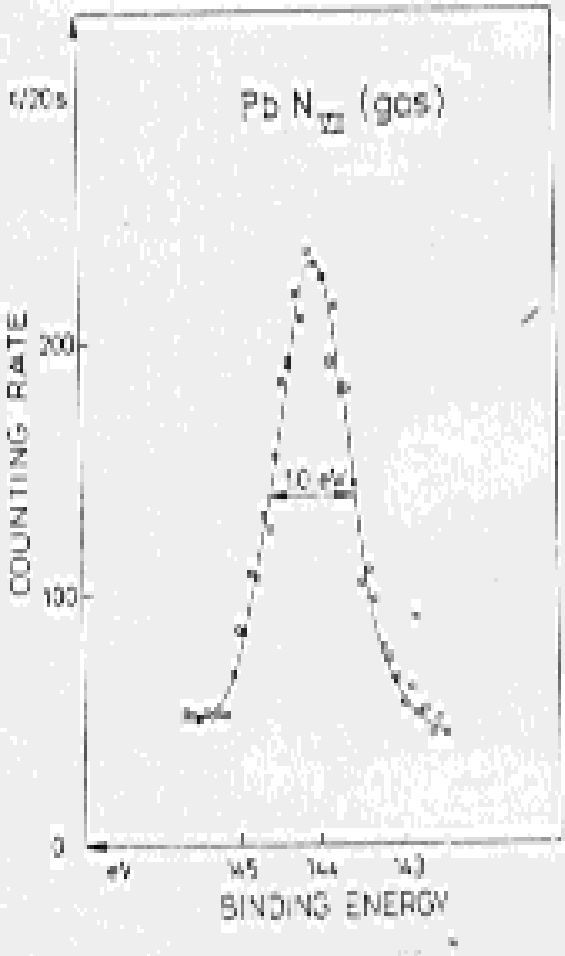
Composition of vapors can be determined from the spectra of these molecular beams

High temperature vapors contain polymeric Components, these can be studied by core electron lines of the ESCA spectra

Molecular beam arrangement of ESCA studies

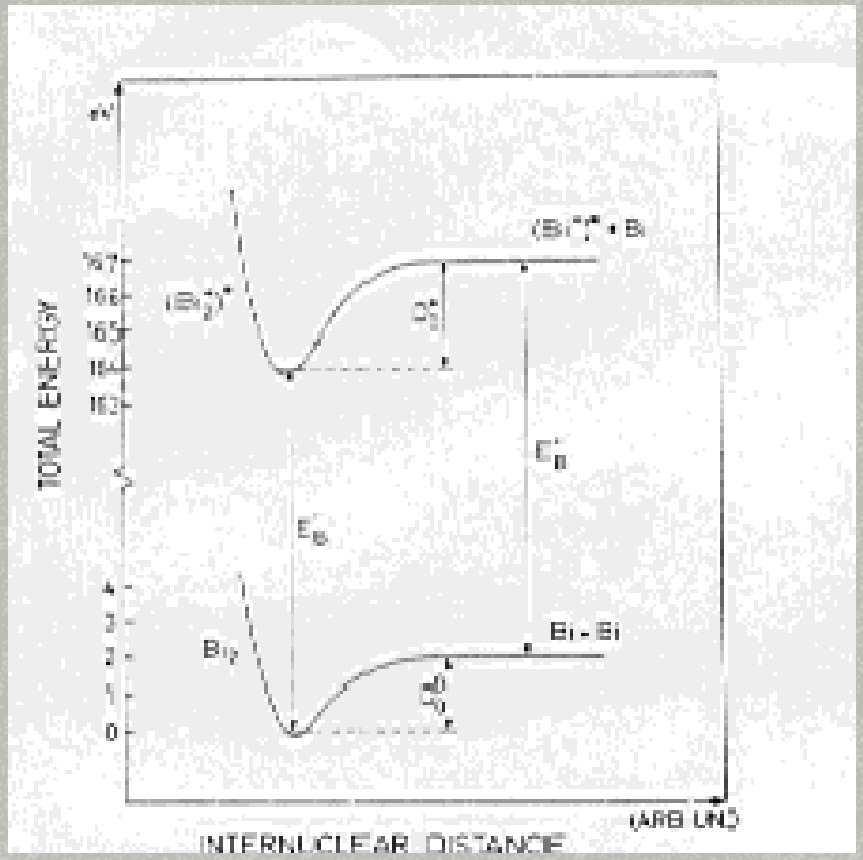






$4f_{7/2}$ (N_{VII}) electron line of Bi+Bi_2 obtained from molecular beam

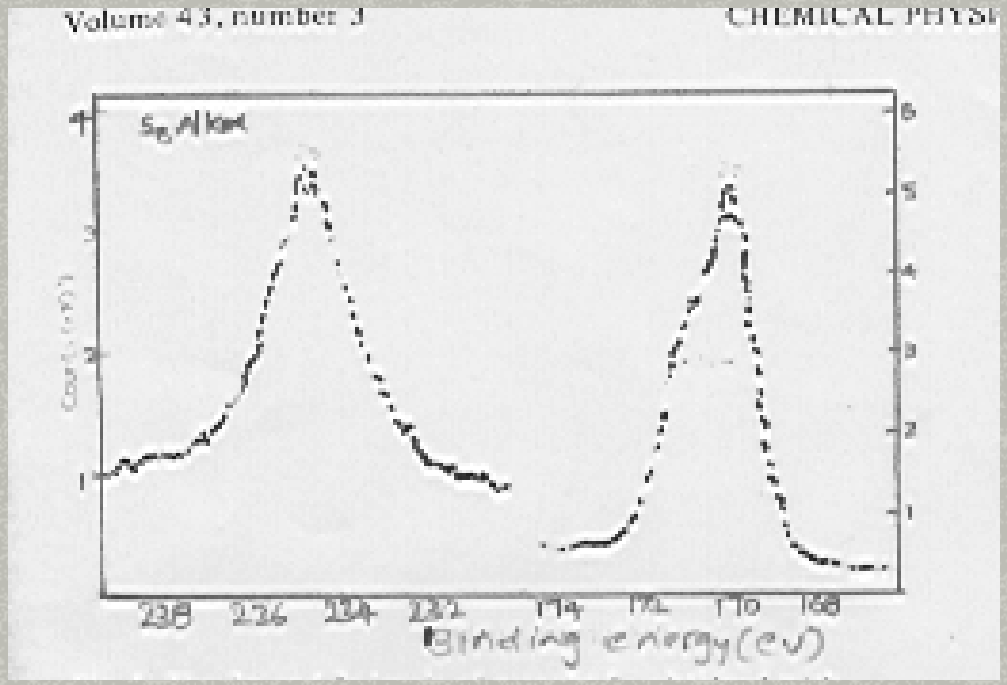
$4f_{7/2}$(N_{VI}) electron line of Pb from molecular beam



$$E_B'' - E_B' = D_0^+ - D_0^0$$

Potential curves of the bismuth diatomic molecule illustrating the relation between $4f_{7/2}$ electron binding energy of the molecule (E_B') and the atom (E_B'')

XPS of gaseous S_8 vapors



The 2p and 2s levels of gaseous S_8 obtained with 1486.6eV radiation , the two levels were measured in different runs and the scales are adjusted to reflect the intensity ratio.

Conclusions:

Molecular beam ESCA studies were highlighted

ESCA studies of Bi and Pb vapors were discussed

XPS of sulfur vapors was also explained

References:

1. Khodeyev.Y.S , Siegbahn.H , Hamrin.K and K.Siegbahn, *Chem. Phys. Lett.19 (1973) 16-19*
2. Banna.M.S , Frost.D.C , McDowell.C.A and Wallbank.B , *Chem.Phys.Lett.43 (1976)426-428*