

Analysis of organic EL material by JMS-T100GC "AccuTOF GC"

~ comparison of FD and DEI methods ~

Introduction

Field desorption (FD) is an ionization method utilizing electron tunneling effect in high electric field near the emitter surface or whisker tip. Sample is applied on an emitter and heated up by applying an electric current through the emitter inducing desorption and ionization.

FD has been used to analyze nonvolatile compounds, polymers, etc. as soft ionization method, generating an intact molecular ion and very few fragment ions in most cases.

We have compared FD and desorption electron ionization (DEI), which are both direct sample introduction methods, for the analysis of an organic electroluminescence material with many aromatic rings.

Methods	Sample:	4,4'-Bis(2,2-diphenyl-ethen-1-yl)biphenyl (DPVBi) (Luminescence Technology Corp.)
	FD conditions:	Cathode potential: -10 kV Emitter current program: 0 mA → 51.2 mA/min → 40 mA
	DEI conditions:	EI conditions: 70 eV, 300 μA DEP conditions: 0 A → 5.12 A/min → 1.0A
	Acquired mass range:	m/z 35 – 600
	Spectral recording interval:	0.5 sec

Results and discussion

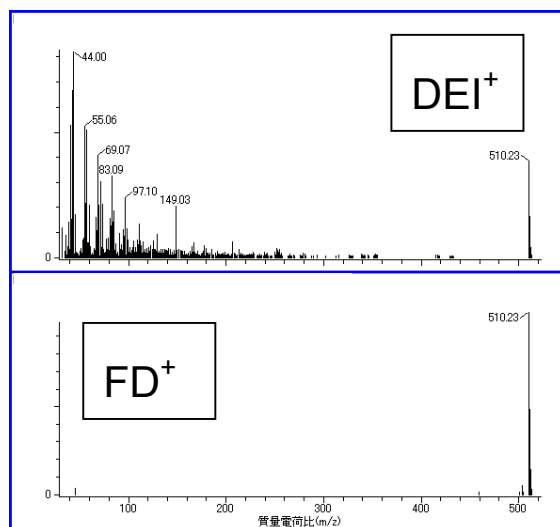


Fig. 1 Mass spectra of DPVBi

Table 1 Accurate mass measurement result

Mass	Intensity	Calc. Mass	Mass Diff. (mmu)	Formula	Unsaturation
510.23378	217546.53	510.23475	-0.97	C ₂₄ H ₂₀	26.0

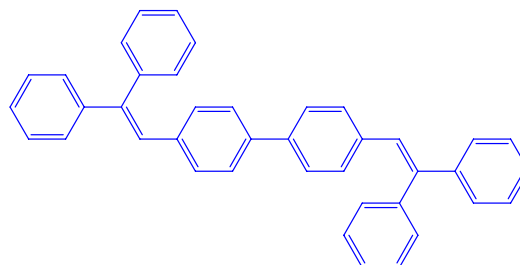


Fig. 2 Structure of DPVBi

As shown in Fig. 1, a lot of fragment ions were observed in addition to the molecular ion with the DEI method. With the FD method, confirmation of molecular weight was very straightforward as only the molecular ion was observed. Moreover, AccuTOF GC is capable of performing accurate mass measurement with FD, as shown in Table 1, and the molecular formula of DPVBi was readily confirmed.