

technique by a Hewlett-Packard 5890A gas chromatograph, JEOL DX-303 mass spectrometer equipped with post acceleration type high sensitive ion detector and JMA-DA5100 computer system. Two ul of the sample solution was injected into GC-MS in splitless mode. This SIM system enabled us to monitor totally forty ions in five divided measurement times (See "Multi ion detection program for PCDDs/PCDFs" in analytical condition)(5). In this analysis, two or three ions from each congener groups were monitored (Fig. 1). Another chlorinated pesticides were also determined in a single injection. The GC/MS condition are shown as follows.

GC/MS condition

Capillary column : SPB-1, 30m x 0.25mm ID, 0.25µm
 Temp. PCDD/PCDF : 100-190-300°C, 20°C/min, 8°C/min
 PCB : 100-150-280°C, 30°C/min, 6°C/min
 Pesticides : 80-150-280°C, 30°C/min, 6°C/min
 Injection : Splitless mode
 Carrier gas : He₂ 1ml/min

(EI)		(NCI)	
Inj. Temp. : 300°C		Inj. Temp. : 280°C	
Sep. Temp. : 300°C		Sep. Temp. : 280°C	
Chamber Temp. : 280°C		Chamber Temp. : 250°C	
Ionization Energy : 70ev		Reactant gas : iso-butane	

Multi ion detection program

[PCDDs/PCDFs]

- Group-1 (8'00 -11'40)
m/z 236,238,252,254,270,272,286,288
- Group-2 (11'48 -13'16)
m/z 241,257,304,306,318,320,332,334
- Group-3 (13'24 -15'23)
m/z 277,293,338,340,342,354,356,358
- Group-4 (15'30 -17'22)
m/z 311,327,372,374,376,388,390,392
- Group-5 (17'30 -21'30)
m/z 408,410,424,426,442,444,458,460

[PCBs]

- Group-1 (6'00 -16'30)
m/z 222,224,256,258,290,292,324,326,360,362
- Group-2 (16'38 -24'00)
m/z 360,362,394,396,428,430,462,464,496,498

[Pesticides]

- Group-1 (8'00 -14'00)
m/z 183,219,286,288,373,375,407,409
- Group-2 (14'00 -20'00)
m/z 235,237,246,318,373,375,407,409

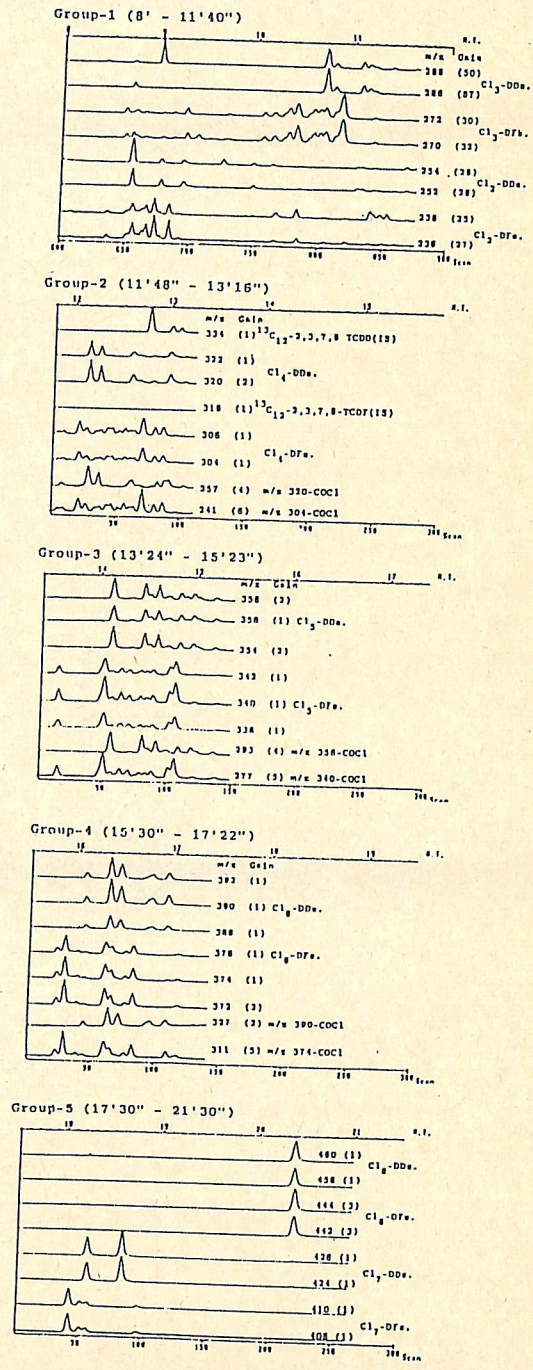


Fig. 1 GC-MS-SIM chromatograms of PCDDs and PCDFs. (Fly ash)