

Supplementary Material for the Manuscript:

Needle Trap Sampling Thermal-Desorption

Resonance Enhanced Multiphoton Ionization Time-
of-Flight Mass Spectrometry for Analysis of Marine
Diesel Engine Exhaust

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Table S-1. Experimental engine parameters of used marine diesel engine.

Engine model	1 VDS 18/15
Method of operation	Four stroke diesel, direct injected, compressor charged
Amount of cylinders	1
Valves	4
Stroke	180 mm
Bore	150 mm
Length of connecting rod	332 mm
Nominal speed	1,500 min ⁻¹
Compression ratio	13
Maximum power	80 kW
Nominal power	60 kW

Table S-2. Specifications for used diesel fuel (DF) and heavy fuel oil (HFO).

Parameter	Test procedure	Unit	DF	HFO
Kin. viscosity at 40 °C	DIN 53015	mm ² /s	3.3	n.d.
Kin. viscosity at 50°C	ASTM D 7042	mm ² /s	n.d.	188.83
Density at 15°C	ISO 12185	kg/m ³	842.5	968.7
CCAI	-	-	n.d.	838
Sulfur	DIN 51400-10	% (m/m)	< 10 mg/kg	1.6
Heating value	DIN 51900-1,-2,-3	J/g	42848	38759
C	DIN 51732	% (m/m)	86.50	83.47
H	DIN 51732	% (m/m)	13.40	11.08
Vanadium		mg/kg	n.d.	76
Water	EN ISO 12937	mg/kg	80	n.d.
Ash	EN ISO 6245	% (m/m)	< 0.001	0.060

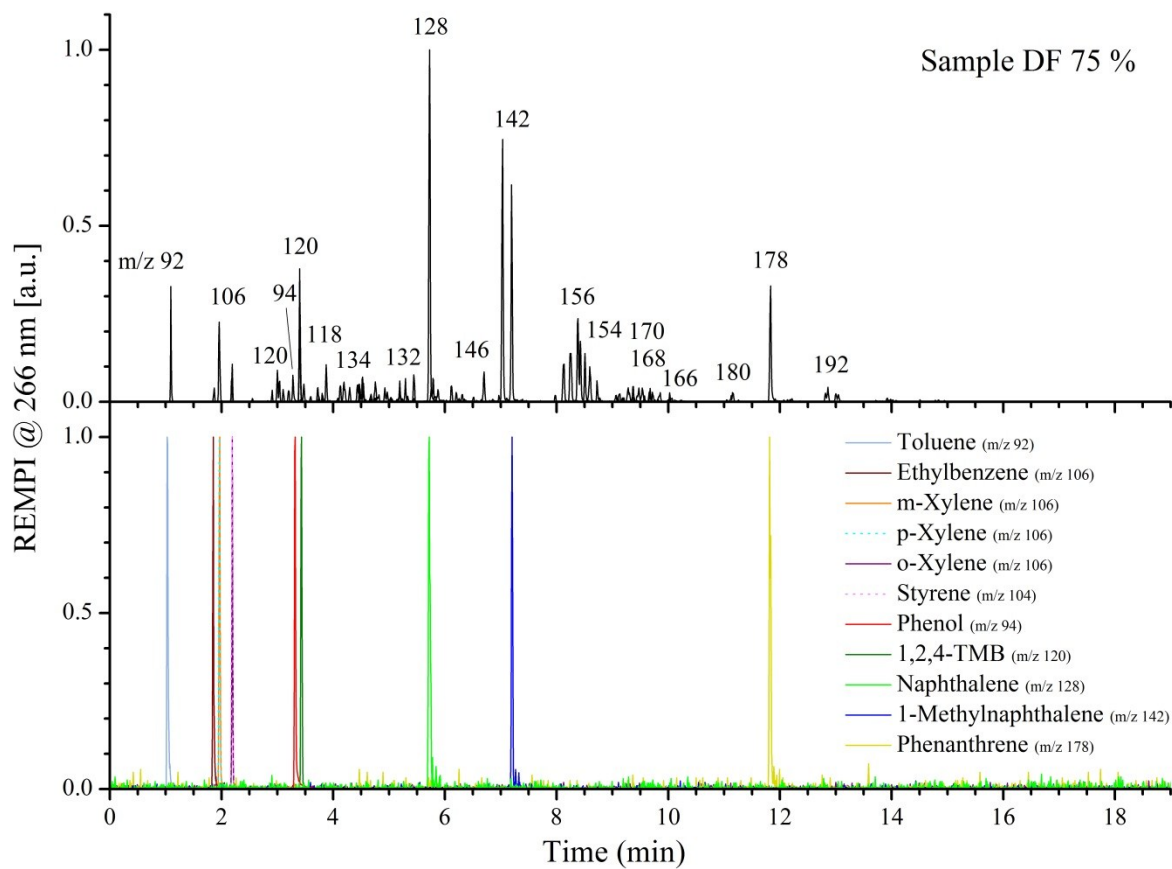


Figure S-1. Gas chromatogram of diesel fuel exhaust measured with NTD-TD-GC-REMPI-TOFMS (266 nm) at an engine load of 75 % (above) and results for separately measured pure substances (below, combined chromatogram).