

Chemical Characterization of Fine Particulate Matter in Gasoline and Diesel Vehicle Exhaust

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SUPPLEMENTARY MATERIAL

Table S1. Estimated PM_{2.5} emission factors for diesel vehicles

Vehicle	Type	Model year	CUMMIL (km)	ZML* (g km ⁻¹)	DET* (g km ⁻¹ per 10,000 km)	Estimation PM _{2.5} emission factor (mg km ⁻¹)
D1	SUV	2006	257,284	0.005	0.000	4.60
D2	Light truck	2009	45,848	0.021	0.001	23.5
D3	Heavy truck	2011	99,714	0.016	0.000	14.7
D4	Heavy truck	2008	208,368	0.096	0.002	127

*Taiwan-EPA (2017). Taiwan emission data system (TEDS) 9.0. Environmental Protection Administration, Taiwan.

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Table S2. Average chemical composition of PM_{2.5} (as the fraction of PM_{2.5} mass) in the exhaust of gasoline and diesel vehicles.

Species	This study GV [†]	This study DV ^{††}	Speciate No. 4931 GV	Speciate No. 4894 DV	Oanh et al. (2010) LDDV [‡]	Oanh et al. (2010) HDDV [§]	Chiang et al. (2012) LDDV	Wu et al. (2016) DT ^{§§}	Zhang et al. (2015) HDDV
EC	0.25591	0.57718	0.36255	0.61636	0.46472	0.48008	0.47682	0.55294	0.60088
OC	0.52573	0.30430	0.42219	0.25719	0.20225	0.13263	0.24503	0.31765	0.25717
K ⁺	0.00167	0.00046	0.00029	0.00073	0.00154	0.00015	0.00025	0.00165	0.00322
Mg ²⁺	0.00100	0.00035	–	–	0.0023	0.00284	0.00007	0.00118	–
Ca ²⁺	0.01934	0.00109	–	–	0.00774	0.01005	0.00075	0.00706	0.00734
Cl ⁻	N.D.*	0.00103	0.00020	0.00078	0.00242	0.00113	0.00002	0.00247	0.00553
NO ₃ ⁻	N.D.	0.00230	0.00152	–	0.00374	0.00158	0.00542	0.00529	0.00631
SO ₄ ²⁻	0.00794	0.00061	0.00399	0.00367	0.01895	0.01741	0.00455	0.00529	0.01096
Al	0.00492	0.00014	0.00038	0.00052	0.0011	0.00062	0.00821	0.00053	–
Ba	0.00034	0.00002	0.00066	–	–	–	0.00064	0.00002	0.00035
Ca	0.01059	0.00078	0.00388	0.00061	–	–	0.00752	0.00000	–
Cd	0.00015	N.D.	0.00004	0.00002	0.00001	0.00003	0.00004	0.00000	–
Co	0.00029	N.D.	–	–	0.00005	0.00001	0.00009	0.00000	–
Cr	0.00059	0.00002	0.00005	–	0.00029	0.00018	0.00028	0.00011	0.00105
Cu	0.00130	0.00045	0.00029	0.00002	0.00058	0.00045	0.00029	0.00004	0.00032
Fe	0.00721	0.00009	0.00242	0.00193	0.0022	0.0008	0.00596	0.00247	0.00653
Mg	0.00193	0.00013	0.00125	0.00029	–	–	0.00134	0.00000	–
Mn	0.00019	0.00009	0.00001	–	0.00006	0.00003	0.00059	0.00002	0.00071
Na	0.03866	0.00271	–	0.00159	–	–	0.00137	0.00000	–
Ni	0.00084	0.00000	0.00007	–	0.00007	0.00005	0.00058	0.00002	0.00225
Pb	0.00199	0.00004	0.00013	0.00004	0.00019	0.00005	0.00050	0.00005	–
Sb	0.00071	0.00007	–	–	–	–	0.00024	0.00000	–
Sr	0.00010	N.D.	0.00000	0.00000	0.00004	0.00002	0.00003	0.00004	–
V	0.00037	0.00017	–	–	0.000004	0.00003	0.00008	0.00001	–
Zn	0.00570	0.00049	0.00561	0.00087	0.00057	0.00083	0.00118	0.00076	0.00035

Note: [†]GV = Gasoline Vehicle, ^{††}DV = Diesel Vehicle, [‡]LDDV = Light-Duty Diesel Vehicle, [§]HDDV = Heavy-Duty Diesel Vehicle, ^{§§}DT = Diesel Truck, *N.D. = Not Detected