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**Supplementary Material**

**For**

**Comprehensive Analysis of the Pollutant  
Characteristics of Gasoline Vehicle Emissions  
under Different Engine, Fuel, and Test Cycles**

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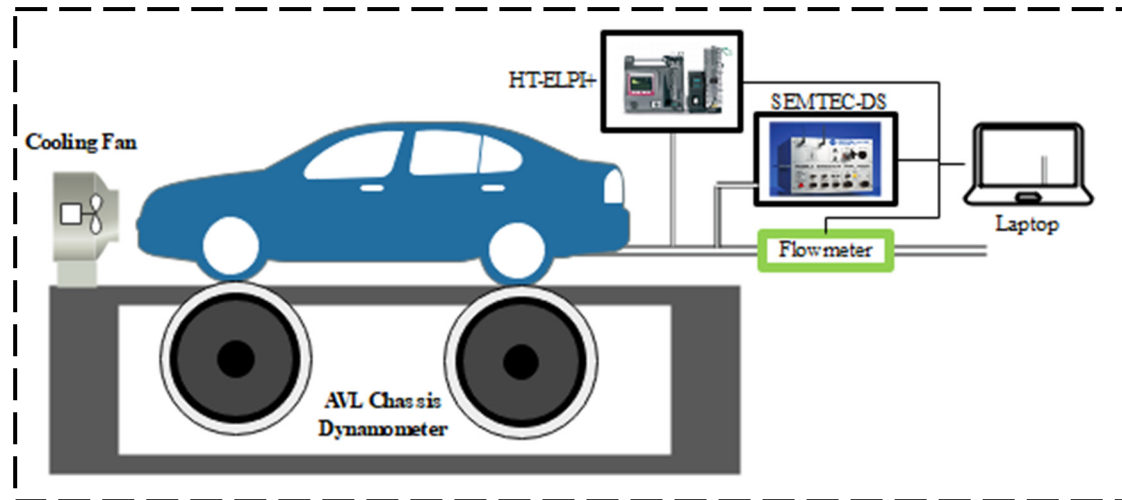
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**Summary of Supplementary information:**

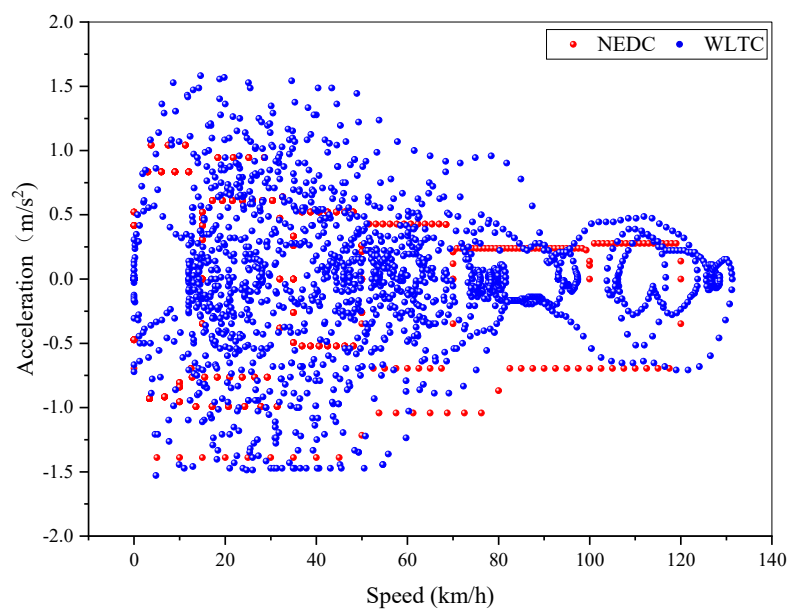
[9 Figures and 1 Table]

[10 Pages]

## 2.3. Test Cycle

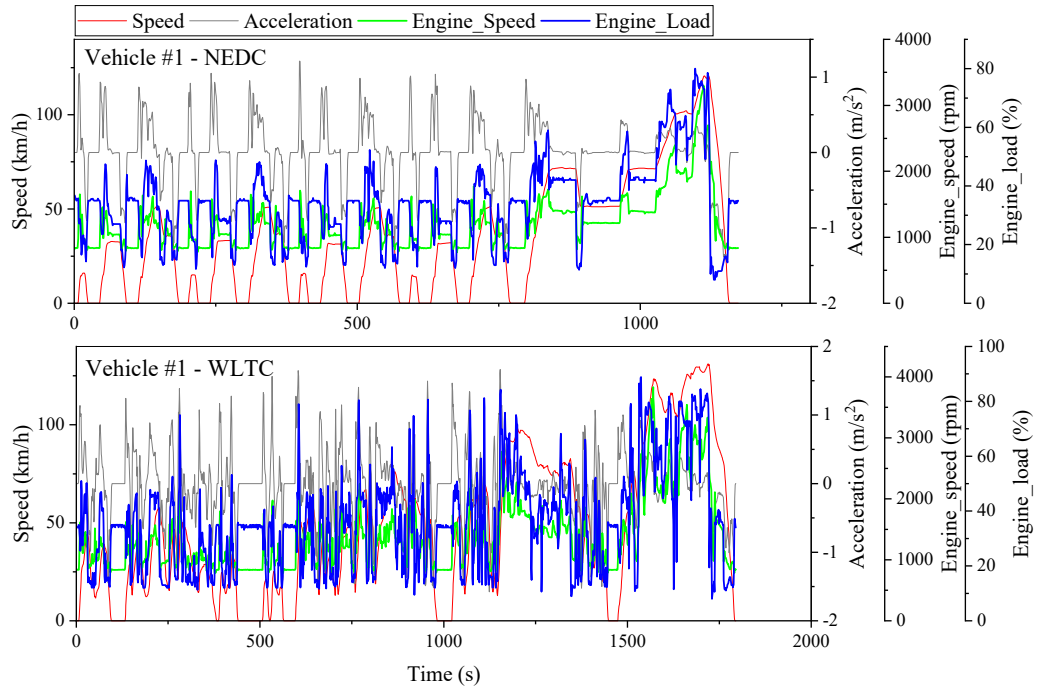


**Figure S1.** Schematic diagram of the test system.

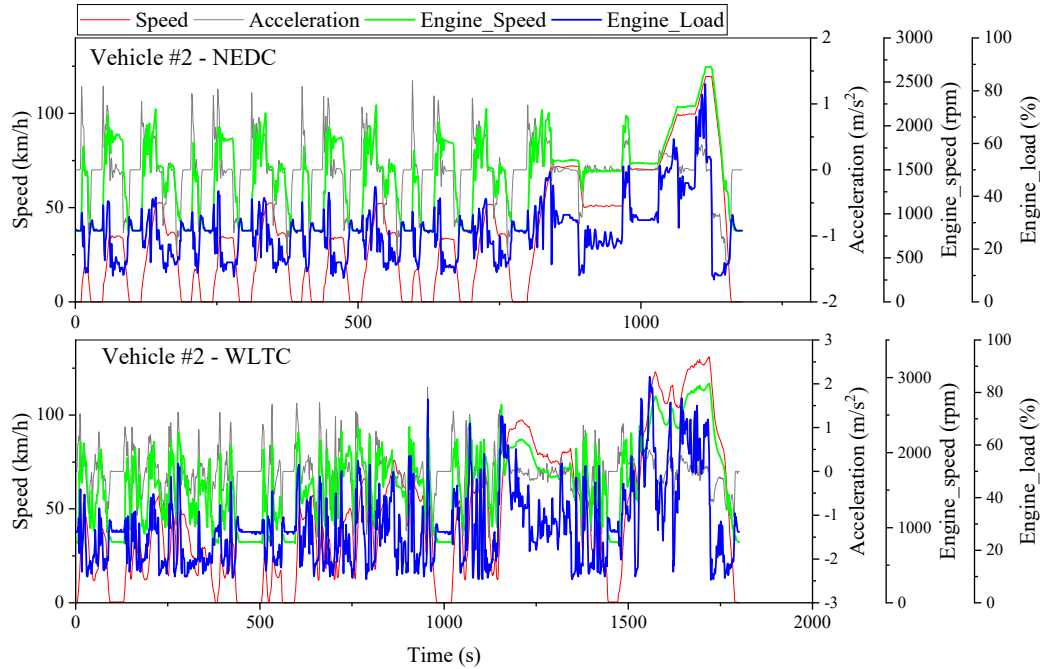


**Figure S2.** Acceleration VS vehicle speed for the NEDC and WLTC test cycles.

### 3.1. Engine Performance of Test Vehicles



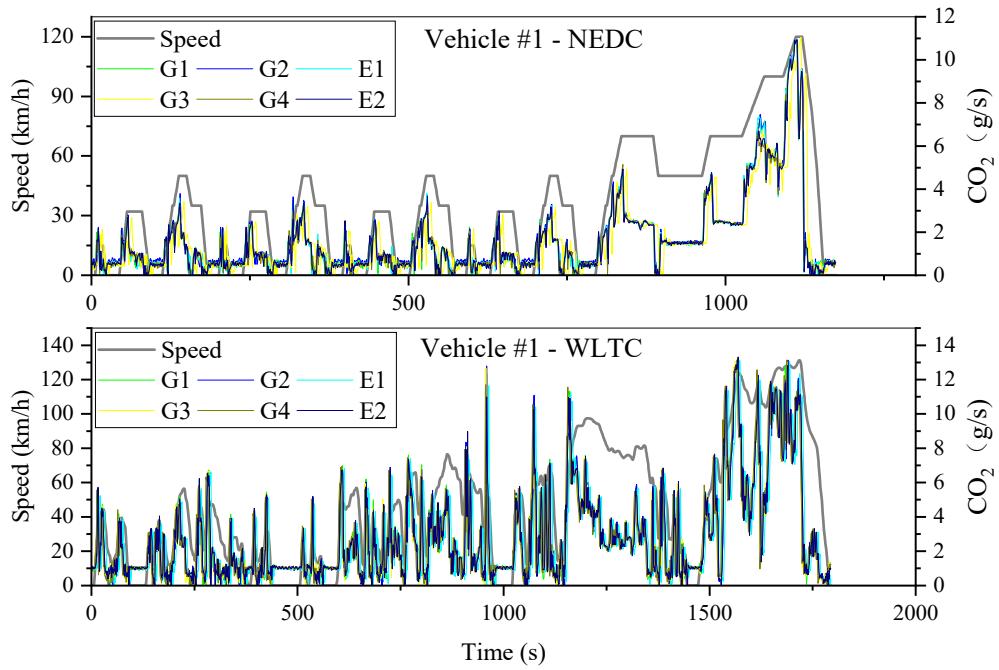
(a) Vehicle #1



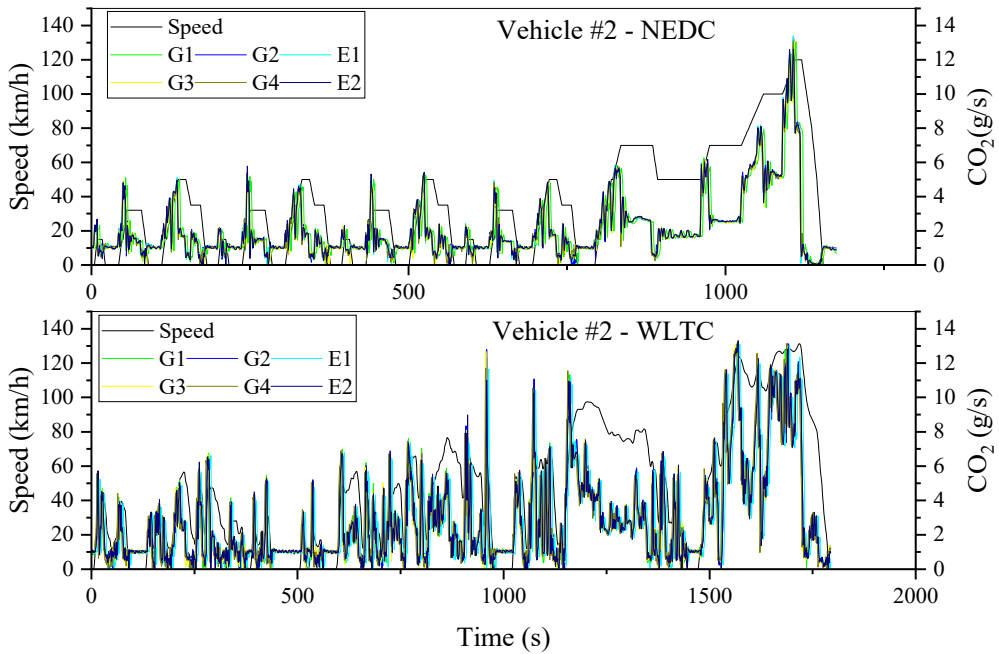
(b) Vehicle #2

**Figure S3.** Time-solved profiles of vehicle' speed, acceleration, and corresponding engine' speed, load.

### 3.2. CO<sub>2</sub> Emissions and Fuel Economy

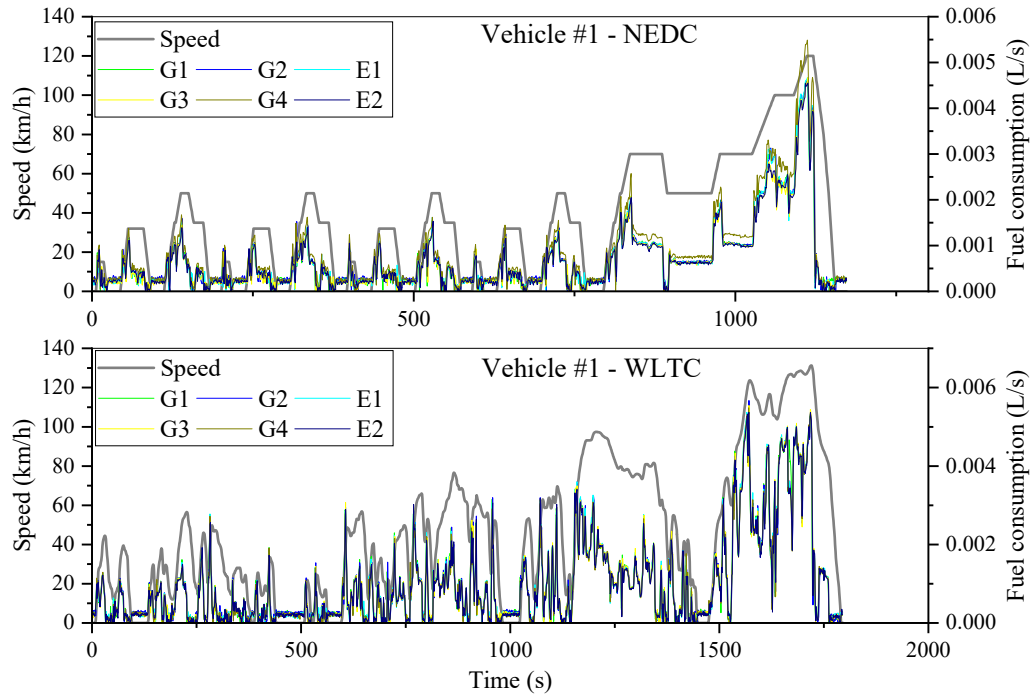


(a) Vehicle #1

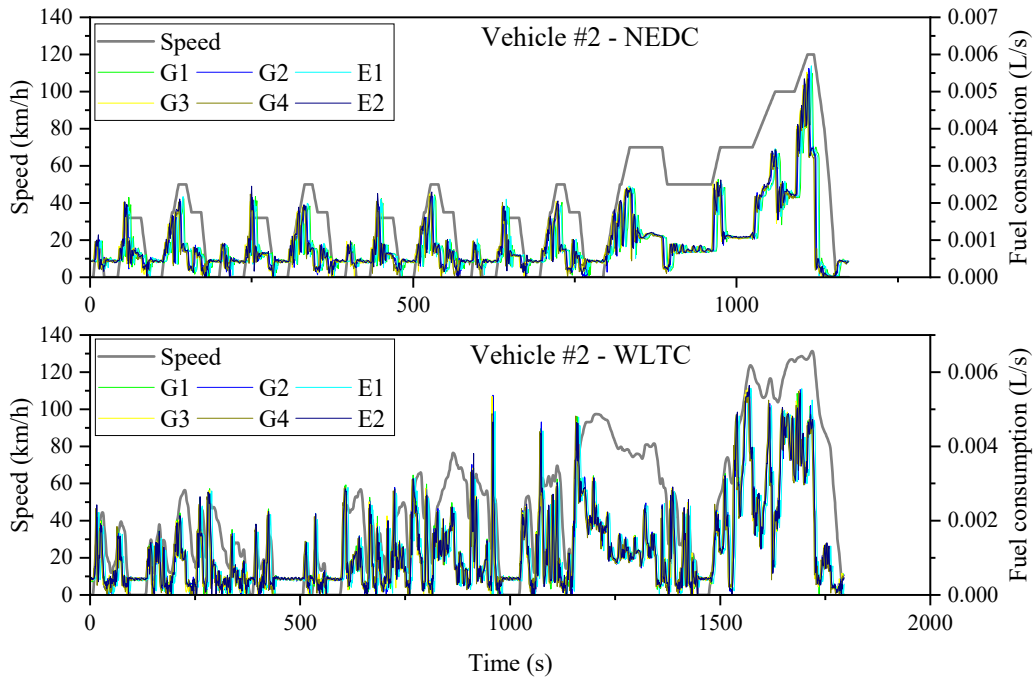


(b) Vehicle #2

**Figure S4.** Time evolution of the CO<sub>2</sub> during the test cycles with eight different test fuels of the two vehicles.



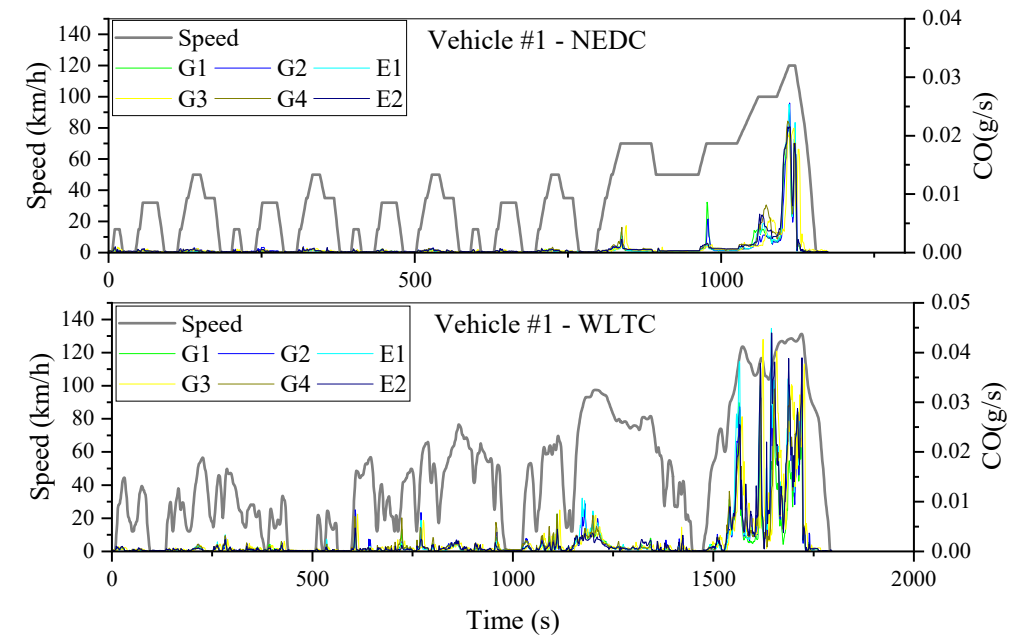
(a) Vehicle #1



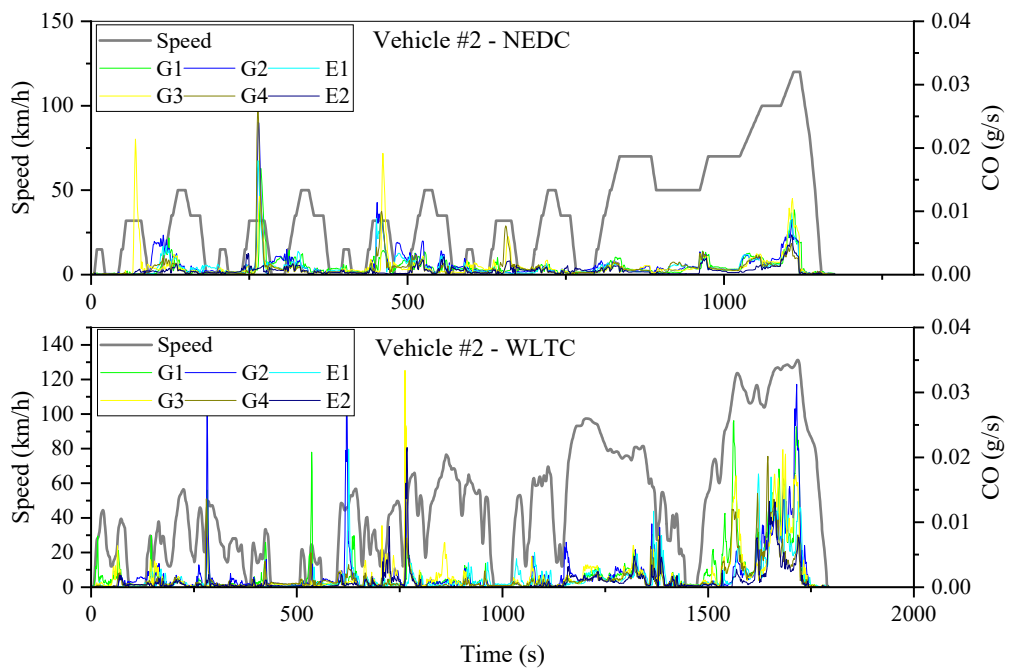
(b) Vehicle #2

**Figure S5.** Time evolution of the instantaneous fuel consumption rate during the test cycles with eight different test fuels of the two vehicles.

### 3.3. CO and NO<sub>x</sub> Emissions

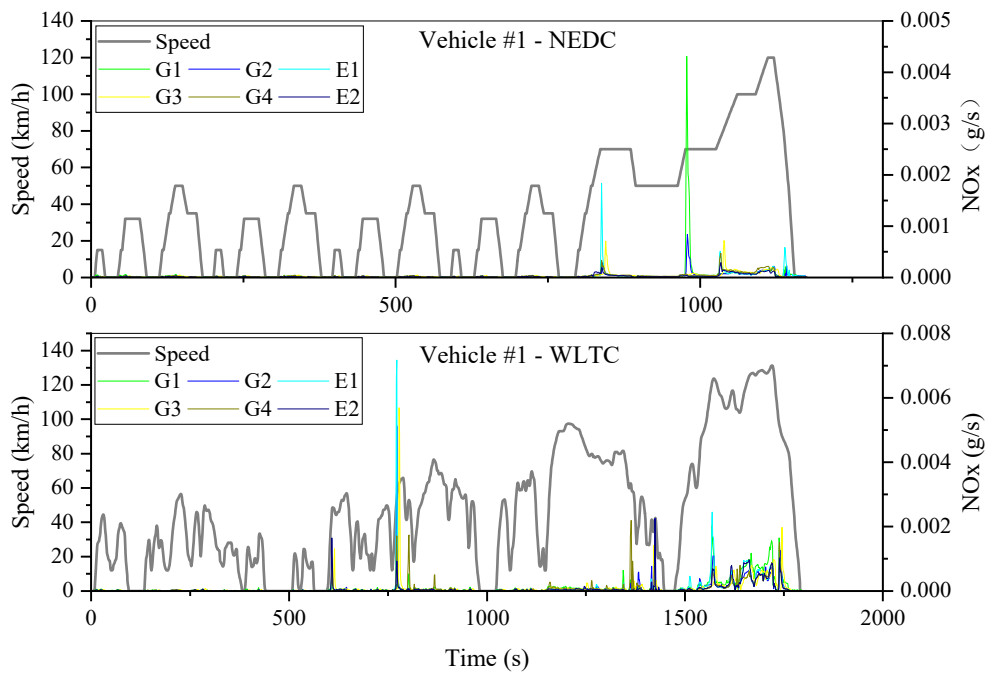


(a) vehicle #1

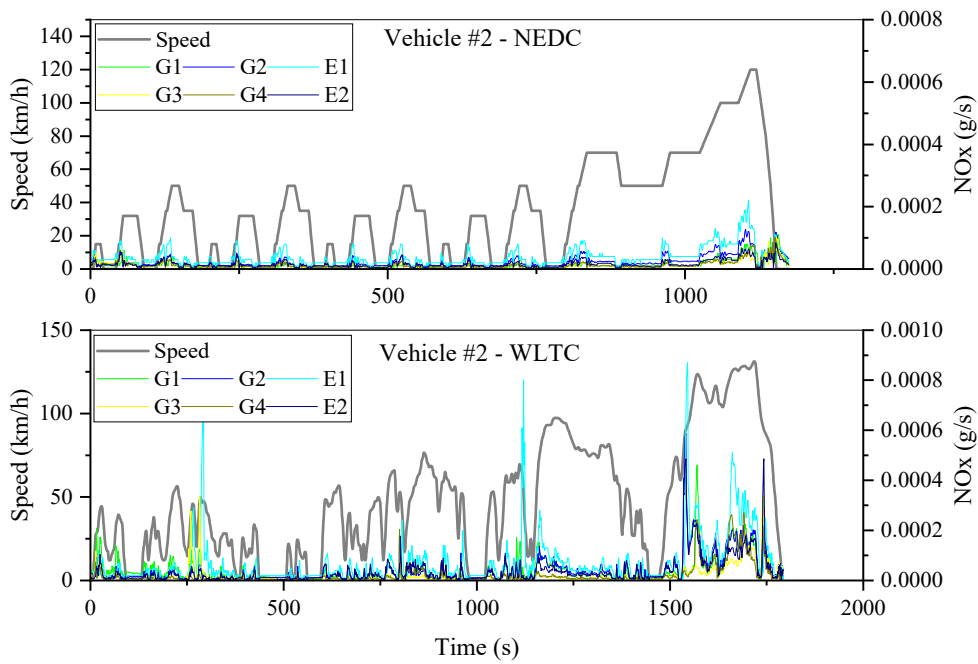


(b) Vehicle #2

**Figure S6.** Time evolution of the CO during the test cycles with eight different test fuels of the two vehicles.



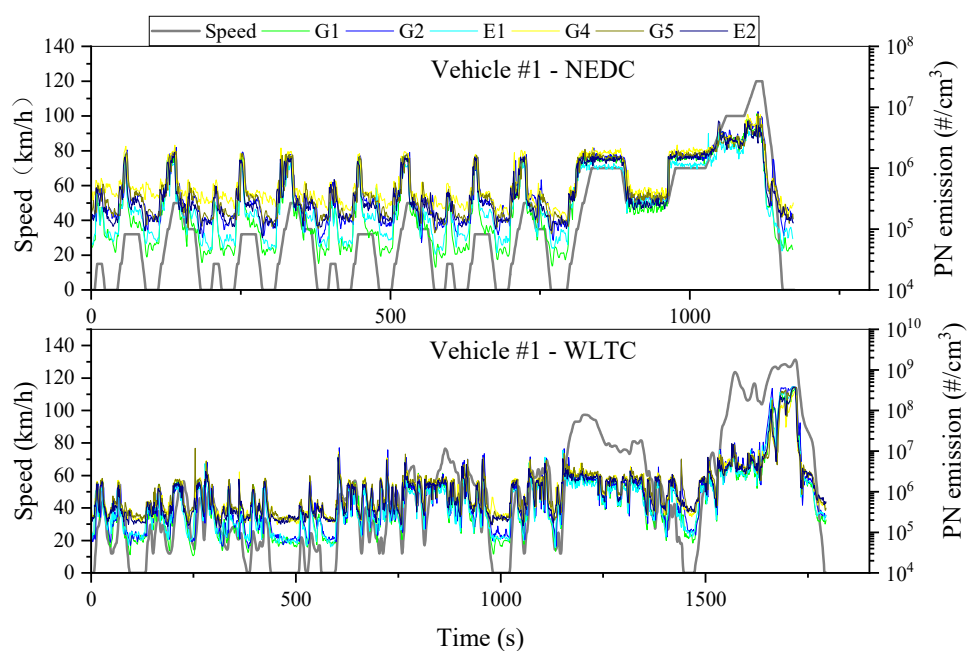
(a) Vehicle #1



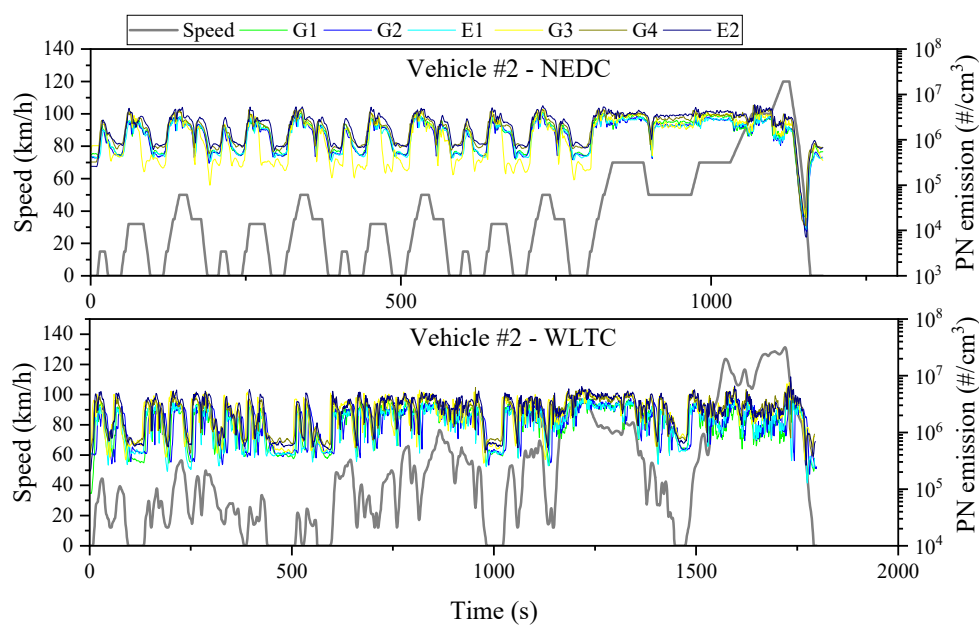
(b) Vehicle #2

**Figure S7.** Time evolution of the NO<sub>x</sub> during the test cycles with eight different test fuels of the two vehicles.

### 3.4. Particle Number Emission



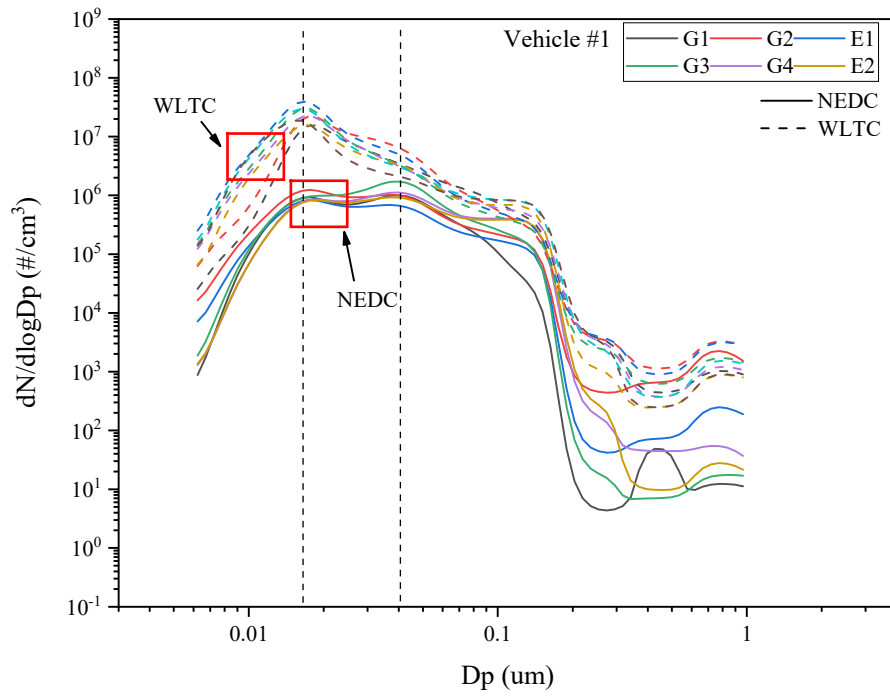
(a) Vehicle #1



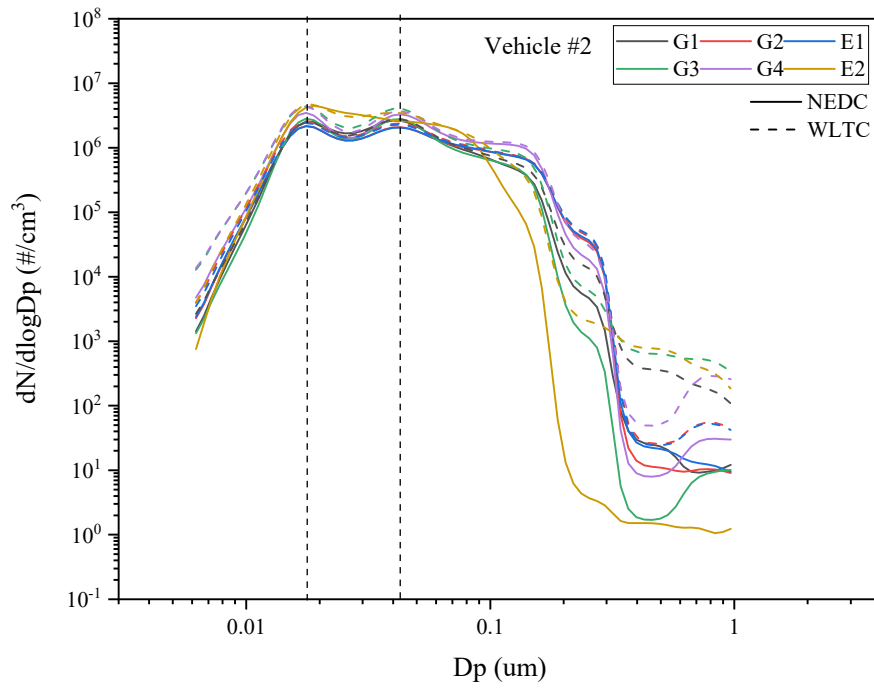
(b) Vehicle #2

**Figure S8.** Instantaneous particle number concentration from the two vehicles during the NEDC and WLTC with different fuels.





(a) Vehicle #1



(b) Vehicle #2

**Figure S9.** The number concentration of particles with different particle sizes.

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### 3.5. Matching of Vehicles and Fuels

**Table S1.** The area of each pentagon in the radar chart (Figure 9).

	Vehicle #1		Vehicle #2	
	NEDC	WLTC	NEDC	WLTC
G1	0.0704	0.0684	0.0585	0.0614
G2	0.0706	0.0749	0.0714	0.0725
E1	0.0571	0.0690	0.0912	0.0886
G3	0.0743	0.0656	0.0552	0.0575
G4	0.0664	0.0616	0.0596	0.0516
E2	0.0574	0.0557	0.0598	0.0613