

Martha Elizabeth Christenson

Thesis

The Effect of Driving Conditions and Ambient Temperature on particulate Matter Emission Rates and Size Distributions from Light Duty Gasoline-Electric Hybrid Vehicles

Abstract

Particulate matter (PM) is an air pollutant known to cause reduced visibility, climate perturbations, and serious health problems when introduced into the human respiratory system. PM emissions from motor vehicles have properties that are known to negatively impact human health. The hybrid-electric vehicle (HEV) has been gaining widespread acceptance and has the potential to reduce emissions through reduced fuel consumption. In this study, PM number and mass emission rates, organic and elemental carbon compositions, and number-based size distributions were measured from four HEVs and one small conventional vehicle over five driving cycles at 20°C and -18°C. Vehicles were also tested at steady-state speeds of 40 and 80 km/h. Testing took place at the Emissions Research and Measurement Division of Environment Canada using conventional chassis dynamometer procedures. The patterns and trends observed could be taken into account when developing new PM modeling approaches.

Degree

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Supervisors

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