

Project Information Form

Project Title:	Emissions from Plug-in Hybrid Electric Vehicle (PHEV) During Real World Driving Under Various Weather Conditions
University:	University of California, Riverside
Principal Investigator:	Heejung Jung Co-PI(s): Chengguo Li
PI Contact Information:	Email: heejung@engr.ucr.edu
Funding Source(s) and Amounts Provided (by each agency or organization):	U.S. Department of Transportation (US DOT) - \$80,210.40
Total Project Cost:	\$80,210.40
Agency ID or Contract Number:	UCR-DOT-305 USDOT DTRT13-G-UTC29
Start and End Dates:	October 1, 2016 – July 31, 2017
Brief Description of Research Project:	<p>Plug-in hybrid electric vehicles (PHEVs) are regarded as a key technology in reducing the impact of internal combustion engines on air pollution and greenhouse gases. PHEVs have the advantage in market penetration due to its lower cost and higher driving range, as compared to electric vehicles (EVs). On the other hand, PHEVs still emit air pollutants due to the presence of an internal combustion engine.</p> <p>Current regulations require emissions to be tested on a chassis dynamometer. However, it is known that on-road emissions can be quite different from that measured in regulatory driving cycles in the lab. In this study, emissions from two HEVs with different combustion technologies (gasoline direct injection vs. port fuel injection) were compared using PEMS (portable emissions measurement system) and tailpipe sensors under cold weather conditions.</p> <p>The study found that the frequency and duration of re-ignition events vary depending on the type of HEV. Prius showed more frequent re-ignition events compared to Sonata for both city and highway driving conditions. Prius re-ignited almost every one minute while Sonata re-ignited every two minutes on average during the city driving condition. Re-ignition events affected emissions profiles significantly during the city driving condition. As a result, the Prius showed higher NO_x emissions during the city driving condition while the Sonata showed higher NO_x emissions during the cold-cold start and highway driving condition. Future studies should include more vehicles to understand whether the re-ignition events are vehicle specific or technology specific.</p>



National Center for Sustainable Transportation

Describe Implementation of Research Outcomes (or why not implemented): Place any photos here	
Impacts/Benefits of Implementation (actual, not anticipated):	
Web Links <ul style="list-style-type: none">• Reports• Project website	https://ncst.ucdavis.edu/project/emissions-from-phevs-during-real-world-driving-under-various-weather-conditions/