TIME RESOLVED FTIR ANALYSIS OF TAILPIPE EXHAUST FOR SEVERAL AUTOMOBILES

ALLEN R. WHITE, JAMES ALLEN,, *Department of Mechanical Engineering, Rose-Hulman Institute of Technology, 5500 Wabash Ave., Terre Haute, IN 47803*; REBECCA B. DEVASHER, *Department of Chemistry, Rose-Hulman Institute of Technology, 5500 Wabash Ave., Terre Haute, IN 47803*.

The automotive catalytic converter reduces or eliminates the emission of various chemical species (e.g. CO, hydrocarbons, etc.) that are the products of combustion from automobile exhaust. However, these units are only effective once they have reached operating temperature. The design and placement of catalytic converters has changed in order to reduce both the quantity of emissions and the time that is required for the converter to be effective. In order to compare the effectiveness of catalytic converters, time-resolved measurements were performed on several vehicles, including a 2010 Toyota Prius, a 2010 Honda Fit, a 1994 Honda Civic, and a 1967 Oldsmobile 442 (which is not equipped with a catalytic converter but is used as a baseline). The newer vehicles demonstrate bot a reduced overall level of CO and hydrocarbon emissions but are also effective more quickly than older units. The time-resolved emissions will be discussed along with the impact of catalytic converter design and location on the measured emissions.