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Electrorheology Leads to Efficient Combustion R. TAO, Dept. of Physics, Temple University , K. HUANG, H. TANG, D. BELL, Temple University — Improving engine efficiency and reducing pollutant emissions are important. Since combustion starts at the interface between fuel and air and most harmful emissions come from incomplete burning, reducing the size of fuel droplets for the fuel injection would increase the total surface area to start burning, leading to a cleaner and more efficient engine. While most efforts are focused on ultra-dilute mixtures at extremely high pressure to produce much finer mist of fuel for combustion, the new technology is still under development and only for next generation vehicles. Here we report our fuel injection technology based on new physics principle that proper application of electrorheology can reduce the viscosity of petroleum fuels. A small device is thus introduced just before the fuel injection for the engine, producing a strong electric field to reduce the fuel viscosity, resulting in much smaller fuel droplets in atomization. Both lab tests and road tests confirm our theory and indicate that such a device improves fuel mileage significantly and reduces emission. The technology is expected to have broad applications, applicable to current internal combustion engines and future engines as well. Supported by STWA and RAND.

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