

## Fuel Design for efficiency improvement and pollutions reduction in transportation system

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Transportation system is one of major contributors to fuel consumption and greenhouse gas emissions, to address people's increasing concern on energy crisis and global warming, it is essential to improve the combustion efficiency and reduce the major pollutions of transportation system. In this work, our latest findings on fuel design and its impact on combustion process and emissions formation in IC engines are presented. First, a brief introduction will be given on the sooting tendency of various fuel surrogates with different molecular structures. Then, the impact of biodiesel with different unsaturation level on the performance and emissions formation of IC engine will be presented, followed by an introduction on performance and emissions of IC engine fueled by emulsion fuel with organic nano particles. We will also present our latest investigation results on supplemental gas induction on combustion and emissions formation in IC engines. Finally, the impact of PODE on the sooting tendency will be presented.