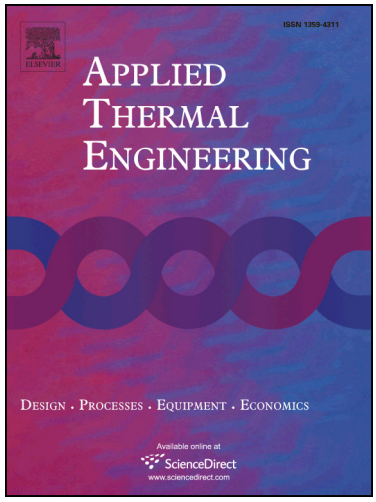

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Abstract

Designed to inject gasoline fuel directly into the combustion chamber, gasoline direct injection (GDI) combustion systems are gaining popularity within the automotive industry. This is because GDI engines offer less pumping and heat losses, enhanced fuel economy and improved transient response. Nonetheless, the technology is often associated with the emission of ultra-fine particulate matter (PM) to the atmosphere. With increasingly stringent emission regulations, detailed understanding of PM formation within GDI engine configurations is very crucial. To complement the findings based on experimental and optical techniques, computational fluid dynamics (CFD) modelling has been widely utilized to study the in-cylinder physical and chemical events. The success of CFD simulations also requires an accurate representation of gasoline fuel kinetics. Set against this background, the present