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Title

Improvement of Natural-Gas HCCI Combustion by Internal EGR by Means of Exhaust Valve Re-Opening

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Abstract

To control natural-gas HCCI combustion, internal exhaust gas recirculation (EGR) by exhaust valve re-opening (EVRO) during the induction stroke was applied to a single-cylinder test engine. The results demonstrate that combustion phasing can be controlled successfully by adjusting the EGR ratio, and so improvement of thermal efficiency and reduction in unburned exhaust emissions are feasible. In addition, the results of the EVRO method were compared to those of intake-valve pilot opening (IVPO) during the exhaust stroke. It was shown that EVRO is more useful than IVPO as a heat-recovery method for HCCI combustion.