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Autore	Sun Wenyu
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Nota di contenuto	Introduction -- Experimental and kinetic modeling methods -- High-temperature kinetics of carbonate and ketone fuels -- Low-temperature oxidation kinetics of polyether fuels -- Addition effects of oxygenated fuels on hydrocarbon premixed flames -- Conclusions and perspective.
Sommario/riassunto	In this thesis, attention was paid to several novel oxygenated fuels—carbonates, polyethers and ketones. Combustion kinetic investigations were performed for typical representative compounds, including dimethyl carbonate, diethyl carbonate, cyclopentanone, 3-pentanone, 1,2-dimethoxyethane and dimethoxymethane. For experiments, suitable diagnostic techniques were used to measure the detailed speciation information of the target fuels under different conditions. For kinetic modeling, rate coefficients for crucial elementary reactions were obtained through high-level theoretical calculations. Based on that, validated kinetic models with good predictive performances were

developed. On the basis of experimental measurements and model interpretations, this work highlighted two important combustion characteristics regarding the practical use: the pollutant formation and the ignition performance. Besides, the correlation between oxygen-containing functional groups and the aforementioned combustion characteristics was revealed. To reveal the potential interactions between the reaction networks of oxygenated additives and the hydrocarbon base fuels during combustion. Chemical structures of laminar premixed flames fueled by binary fuels were measured, and by changing the initial fuel compositions, the addition effects of the oxygenates on the fuel consumption and pollutant formation behaviors were explored. It was found that complicated chemical interactions do not exist in the reaction networks under the investigated conditions.