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COMBUSTION

This is a set of lectures on Combustion Basics (there is little here on practical systems), organised in the following topics:

- Combustion characteristics. A descriptive presentation of what is combustion, what it is for (applications), how it is done (practical combustors), and what was historically known.
- Fuels, Fuel properties, Fuel consumption, and Pyrotechnics. An extensive descriptive presentation, with an historical development review.
- Combustor characteristics. A short description, following a block diagram approach, of what to study in a generic combustor: intake, internals, heat and work flows and exhaust.
- Environmental effects and hazards in combustion. A descriptive presentation of potential source of damege in combustion applications, with a review of fire safety, pollutant emissions, and generic safety management.
- Combustion thermodynamics. A mathematical formulation of equilibrium conditions, based on the extent of reaction and the affinity of reaction, and with emphasis on the enthalpy of reaction (the maximum heat, or heating value), the exergy of reaction (the maximum work) and the exhaust equilibrium composition.
- Combustion kinetics. A descriptive presentation of the detailed mechanism of reaction rates, activation energy and its modification by catalysts.
- Combustion models. A mathematical formulation of some key combustion problems: combustion at rest, premixed combustion and non-premixed combustion, with emphasis on flame geometry.
- Combustion instrumentation. A descriptive presentation of devices and procedures for the setting, control and diagnosis of combustion processes.

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