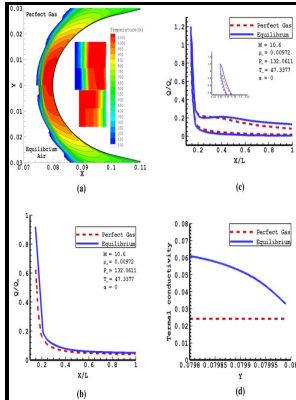


Conical flow parameters for air in dissociation equilibrium

General Dynamics Corporation, Convair Division - Performance of conical ammonia dissociation reactors for solar thermochemical energy storage



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- Conical flow parameters for air in dissociation equilibrium

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General Dynamics Corporation, Convair Division, Research Report -

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Performance of conical ammonia dissociation reactors for solar thermochemical energy storage

This paper explores the effects of geometry and configuration on the conversion of ammonia dissociation reactors.

IHS ESDU: Aerodynamics

Whereas including the exchange reactions weakly affects the flow, switching between the Park and McKenzie sets of parameters results in significant modification of the kinetic mechanisms; for the McKenzie model, recombination near the wall is a dominating reaction, whereas for the Park model, chemical reactions are frozen.

Performance of conical ammonia dissociation reactors for solar thermochemical energy storage

This thickened boundary layer displaces outer inviscid flow hence freestream hypersonic flow encounters an inflated object which changes the shock shape and internal boundary layer parameters along with surface pressure, wall heat flux, skin friction etc.

Numerical analysis of air dissociation influence on spaceplane aerodynamic characteristics

Increased internal energy leads initially to vibrational excitation followed by dissociation and finally ionization according to the extent of increase in internal energy.

Supersonic flow past a sharp cone oscillating about a zero angle of attack

Part IIIB: Alleviation of unsteady flow effects - acoustic suppression using passive devices. Oxygen dissociation starts at around 2000 K and completes at 4000 K. Therefore at these elevated temperatures, treatment of fluid as calorically perfect or with constant thermodynamic properties leads to unrealistic estimations.

Numerical analysis of air dissociation influence on spaceplane aerodynamic characteristics

However, there has not been much enhancement proposed to improve the conversion of the ammonia dissociation reactor, which determines the solar energy absorbed. A two-dimensional pseudo-homogeneous model has been developed to simulate reaction kinetics and thermodynamics in conical as well as cylindrical ammonia dissociation reactors.

Numerical analysis of air dissociation influence on spaceplane aerodynamic characteristics

Recently, lots of research has been done to advance the heat recovery process of an ammonia synthesis system in the context of ammonia-based solar thermochemical energy storage. Different contributions to the heat flux are evaluated and a satisfactory agreement with experiments is shown.

Part II: Open and transitional flows.

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