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Experimental study on diffusion combustion of high-speed hydrogen round microjets. Part I: Attach flame in subsonic flow

Introduction: The objective of the present work is experimental investigation of the diffusion combustion of hydrogen microjets emanating from various micronozzles including a Laval supersonic quasi-micronozzles of different configuration and size. In what follows we focus on the characteristics of the bottleneck flame region depending on the microjet efflux velocity, the influence of this particular flow area upon heating of a thick-walled nozzle and the effect of heating on the origination of the bottleneck flame region at variation of jet velocity up to the transonic range. Also, we are interested in indications which could be helpful in experimental work to distinguish between subsonic and supersonic regimes of hydrogen jets and their combustion.

Conclusion: A scenario of subsonic diffusion combustion of the round hydrogen microjet is proposed. It is found that heating of a thick-walled micronozzle with large thermal capacity by the bottleneck flame region results in the nozzle choking and may have a significant effect on the microjet combustion.

Biography

V V Kozlov working as a professor at the Novosibirsk University, Russia. He completed his PhD in the Candidate's degree in Physics-Mathematics from ITAM Novosibirsk and his Master's degree at Novosibirsk State University, Russia. He is a Scientific research fellow at ITAM, Novosibirsk. Head of Laboratory of Aero-Physics Researches at ITAM, Novosibirsk

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