The influence of Mach number of shock wave on turbulent mixing growth at interface of gases

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ABSTRACT

The authors present results of experiments with study of turbulent mixing occurred at Richmeier-Meshkov instability in gases at the Mach number's variation of shock wave from ≈ 1.4 to ≈ 9.

Experiments were performed with use of an air shock tube with the channel section of (40×40) mm. The shock wave passed from «light» to «heavy» gas. Air was used as «light» gas, Xe, CO_2, SF_6 – as «heavy» gases. Gases were initially separated thin (≈ 1 μm) polymer film, which was failed after shock wave passing. The registration of the flow was held using high-speed camera by the schlieren method.

It was obtained that the width of mixing zone and the speed of its growth increase with the growth of the Mach number of shock wave.