

DOMAINS AND BOUNDARIES OF PSEUDOSTATIONARY OBLIQUE-SHOCK-WAVE REFLECTIONS IN CARBON DIOXIDE

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Oblique shock-wave reflections caused by a planar shock wave impinging on sharp wedge were studied interferometrically in a 10 cm x 18 cm hypervelocity shock tube over the initial shock Mach number range 1.8- 10.2 and pressure range p_0 3 - 80 torr. The transition criteria for regular, single Mach, complex Mach and double Mach reflections were established analytically and checked experimentally for this purpose. Five models of equations of state were used, from complete dissociational-vibrational equilibrium to a perfect (frozen) gas with $\gamma = 1.290$. The optical data are in good agreement with analysis for a frozen flow, if the transition boundary between complex and double Mach reflection is based on the criterion that the flow behind the reflected shock wave is supersonic with respect to the second triple point. Alternatively, very good agreement can be obtained with analysis for vibrational equilibrium of all four modes when the flow behind the reflected shock wave is supersonic with respect to the wedge surface. The implications of these models will be discussed as a continuation of the previously published research in monatomic and diatomic gases.