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Experimental Study on Flowfield around Hypersonic Space Plane Utilizing the Electric Discharge Method

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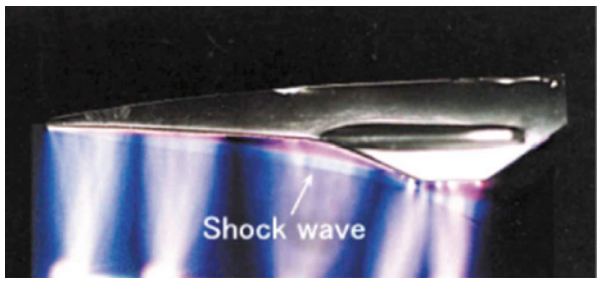

Fig. 1. Lateral shock shape
(Angle of attack is 0°)

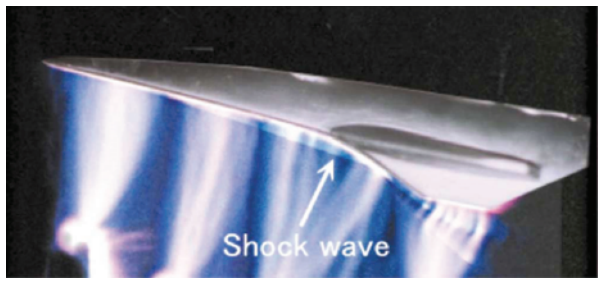

Fig. 2. Lateral shock shape
(Angle of attack is 10°)

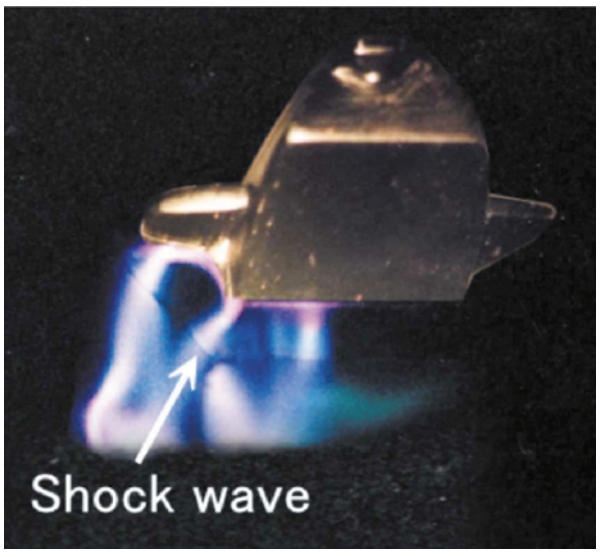

Fig. 3. Back view of shock shape around space plane
(Angle of attack is 0°)

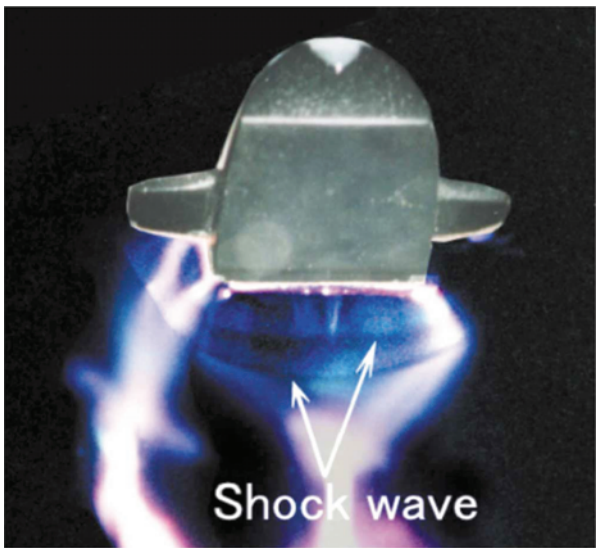

Fig. 4. Back view of shock shape around space plane
(Angle of attack is 10°)

Figures 1-4 show the flowfield around a space plane traveling at the speed of Mach 10. The visualization of the flowfield was carried out utilizing the electric discharge method. The lateral and cross-sectional shock shapes around the space plane were demonstrated. The experiments were carried out under the condition that the model angles of attack were 0° and 10°.

First, we visualized lateral shock shapes under the model of the space plane. The results are shown in Figs. 1 and 2. Next, we visualized cross-sectional shock shapes under the model. The results are shown in Figs. 3 and 4. These photographs were observed by using the mirror from back of the model.