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Instability and turbulent mixing of shocked 'V' shaped interface. LONG LI, YUTAO SUN, Institute of applied physics and computational mathematics — Based on the mass fraction model of multicomponent mixture, the interaction between weak shock wave and 'V' shaped air/ interface with different vertex angles are numerical simulated using high resolution finite volume method with minimized dispersion and controllable dissipation (MDCD) scheme. It is observed that the baroclinic vorticity is deposited near the interface due to the misalignment of the density and pressure gradient, leading to the formation of vortical structures along the interface. The predicted leftmost interface displacement and interface width growth rate in the early stage of interface evolution agree well with experimental results. The numerical results indicate that with the evolution of the interfacial vortical structures, the array of vortices begins to merge. As the result, the vortices accumulate at several distinct regions. It is in these regions, the multi-scale structures are generated because of the interaction between vortices. It is observed that due to the different scaling with Reynolds number of upper bound and lower bound, an uncoupled inertial range appears, and the mixing transition occurs with the appearance of an inertial range of scales. The classical Kolmogorov -5/3 power laws are shown in the energy fluctuation spectrum, which means the inertial range is just beginning to form and the flow field near the material interface will develop to turbulence.

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