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Reaction of Projectiles with Targets during Hypervelocity Impact[1] ROD RUSSELL, STEPHAN BLESS, CHADEE PERSAD, KARTHISH MANTHIRAM, The University of Texas at Austin, Institute for Advanced Technology — Hollow tungsten projectiles were filled with bismuth oxide or copper and shot into aluminum blocks at 2200 m/s. The blocks were cut open, and the contents and morphology of the penetration channels were examined. In the case of copper fill, the channel was found to be filled with a black foam containing closed-cell bubbles. X-ray diffraction revealed the presence of CuAl2, indicating reaction with the aluminum target. In the case of bismuth oxide, there was little foam, but the penetration channel walls had many craters, which contained nodules of bismuth metal, again indicating reaction with the target. There were variations in crater diameter apparently corresponding to the onset and termination of the reactions. The exothermic nature of the reactions produced cracks in the target blocks.

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