Crack tip flipping, where the fracture surface alternates from side to side in roughly 45° shear bands, seems to be an overlooked propagation mode in Mode I thin sheet tearing. In fact, observations of crack tip flipping is rarely found in the literature. Unlike the already established modes such as slanting, cup-cone (rooftop), or cup-cup (bathtub) the flipping crack never settles in a steady-state as the near tip stress/strain field continuously change when the flip successively initiates and develops shear-lips. A recent experimental investigation has revealed new insight by exploiting 3D X-ray tomography scanning of a developing crack tip flip. But, it remains to be understood what makes the crack flip systematically, what sets the flipping frequency, and under which material conditions this mode occurs. The present study aims at investigating the idea that a slight out-of-plane action (Mode III type loading) on the tip of a slant Mode I crack can provoke it to flip to the opposite side. Both experiments and micro-mechanics based modeling support this hypothesis.
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