

## Micro-Texture Effect on Fracture Location in Carbon Steel during Forming

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**Abstract :** Advances in techniques for measuring individual crystallographic orientations have made it possible to investigate the role of local crystallography during the plastic deformation of materials. In this study, the change in crystallographic orientation distribution during deformation by deep drawing in carbon steel has been investigated in order to understand their role in propagation and arrest of crack. The results show that the change of grain orientation from initial recrystallization texture components of  $\{111\}\langle 112 \rangle$  to deformation orientation  $\{111\}\langle 110 \rangle$  incites the initiation and propagation of cracks in the region of  $\{111\}\langle 112 \rangle$  small grains. Moreover, the misorientation profile and local orientation are analyzed in detail to discuss the change from  $\{111\}\langle 112 \rangle$  to  $\{111\}\langle 110 \rangle$ . The deformation of the grain with  $\{111\}\langle 110 \rangle$  orientation is discussed in terms of stops of the crack in carbon steel during drawing. The SEM-EBSD technique was used to reveal the change of orientation; XRD was performed for the characterization of the global evolution of texture for deformed samples.

**Keywords :** fracture, heterogeneity, misorientation profile, stored energy

**Conference Title :** ICMFF 2021 : International Conference on Mechanics of Fatigue and Fracture

**Conference Location :** Paris, France

**Conference Dates :** February 22-23, 2021