Atomistic modeling of idealized equal channel angular pressing process
Supplementary Material

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Supplementary Material

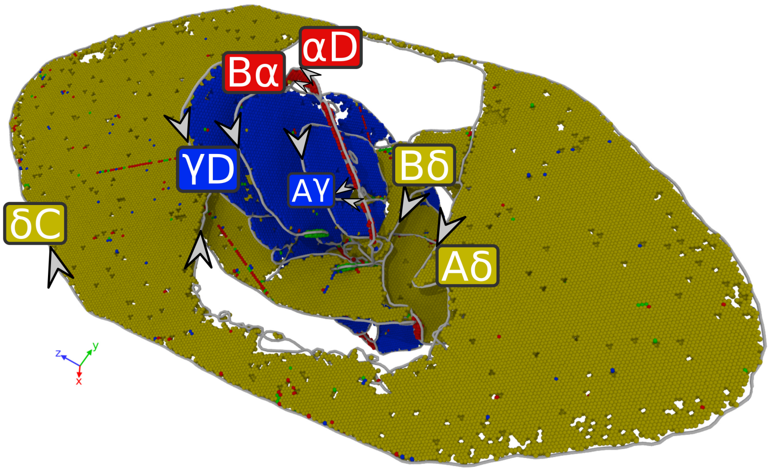
Supplementary movies

The following movies are included as part of supplementary material.

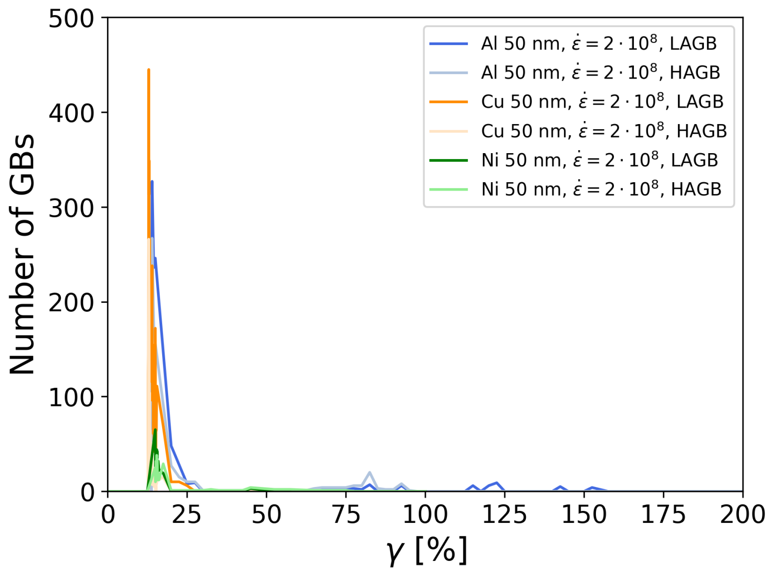
- **Movie M1**: Deformation of Al, 50 nm sample showing the dislocation activity for strain rate $\dot{\epsilon}_{xy} = 2 \cdot 10^8$.
- **Movie M2**: Deformation of Ni, 50 nm sample showing the dislocation activity for strain rate $\dot{\epsilon}_{xy} = 2 \cdot 10^8$.
- **Movie M3**: Deformation of Cu, 50 nm sample showing the dislocation activity for strain rate $\dot{\epsilon}_{xy} = 2 \cdot 10^8$.
- **Movie M4**: Deformation of Al, 100 nm sample showing the dislocation activity for strain rate $\dot{\epsilon}_{xy} = 2 \cdot 10^8$. Only the atoms classified as hcp by the common neighbor analysis algorithm are shown.
- **Movie M5**: Deformation of Al, 100 nm sample showing the dislocation activity for strain rate $\dot{\epsilon}_{xy} = 2 \cdot 10^9$. Only the atoms classified as hcp by the common neighbor analysis algorithm are shown.
- **Movie M6**: Texture evolution and deformation activity from the initial configuration until approx. 15% applied shear in cluster number 1 identified by OrISODATA.
- **Movie M7**: Texture evolution and deformation activity from the initial configuration until approx. 15% applied shear in cluster number 44 identified by OrISODATA.
- **Movie M8**: Texture evolution and deformation activity from the initial configuration until approx. 15% applied shear in cluster number 62 identified by OrISODATA.
- **Movie M9**: Texture evolution and deformation activity from the initial configuration until approx. 15% applied shear in cluster number 66 identified by OrISODATA.

Note: In the movies M1 – M5 showing the deformation of the samples, the simulation box flips after 50% shear. This is a technicality in LAMMPS required to run simulations efficiently, since a large tilt requires a large volume of communication to acquire ghost atoms around a irregular-shaped subdomain of the processor. For more details, the reader is referred to the documentation of the LAMMPS package.

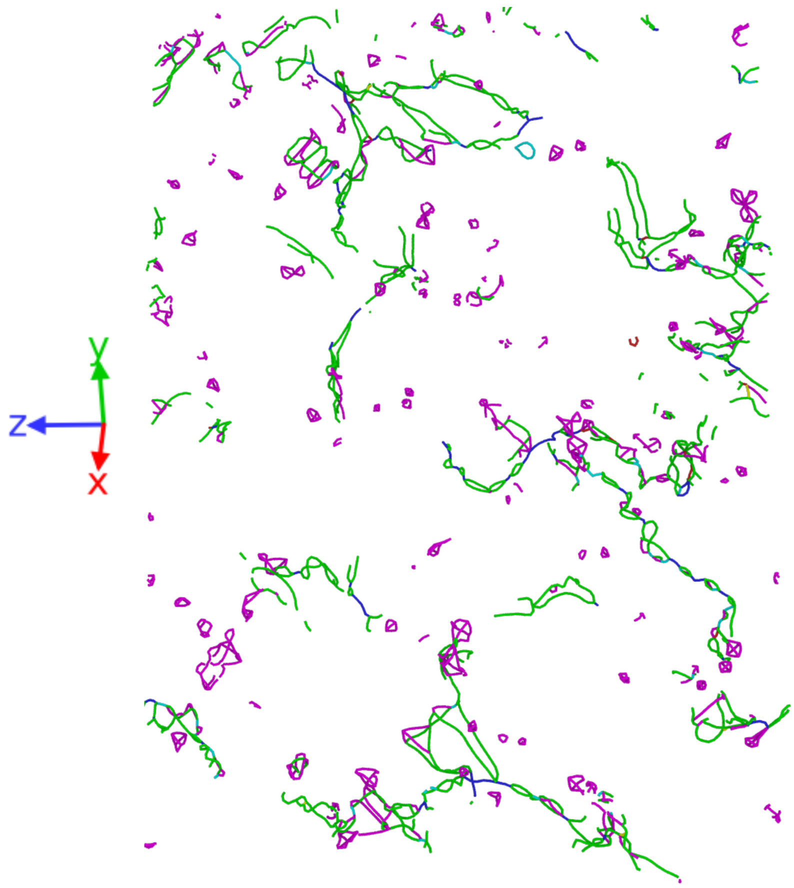
Supplementary figures



Supplementary Figure 1: Expansion of a partial dislocation loop creating a stacking fault in its wake. Shown here is defect configuration after approx. 12.7% shear in the Cu 50 nm sample. Only atoms classified as hcp are shown here. Atoms are colored according to the {1 1 1} planes they belong to. For more details on the color code, the reader is referred to fig. 3 in the main article.



Supplementary Figure 2: Distribution of low angle (LAGB) and high angle (HAGB) grain boundaries in all 50 nm samples.



Supplementary Figure 3: Dislocation cell structure in a slice of 5 nm in the Al 50 nm sample after approx. 165% shear.