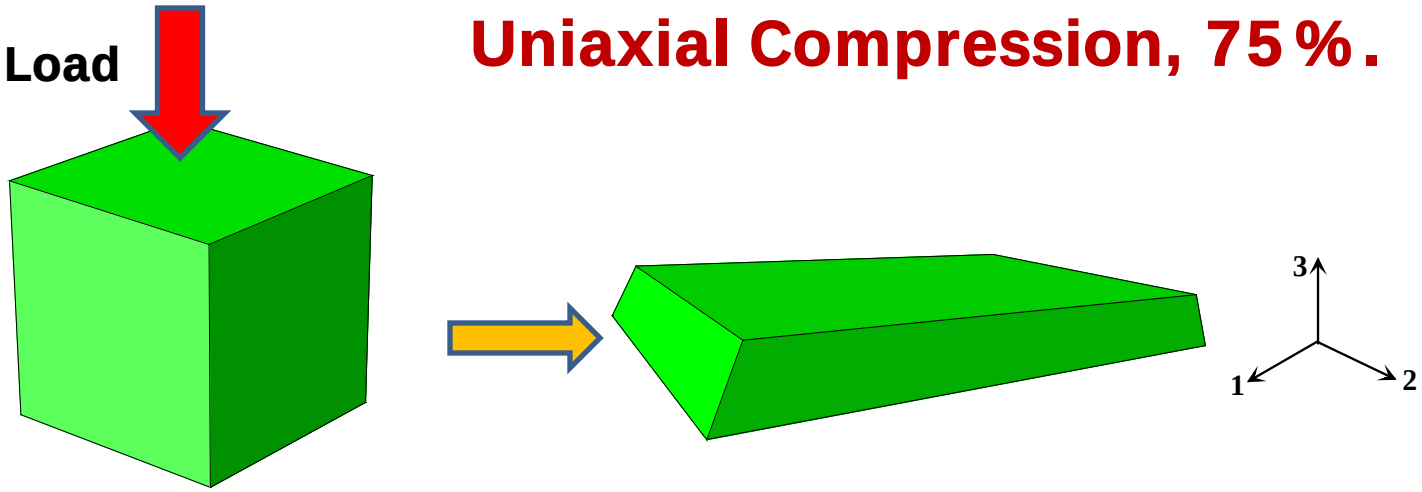
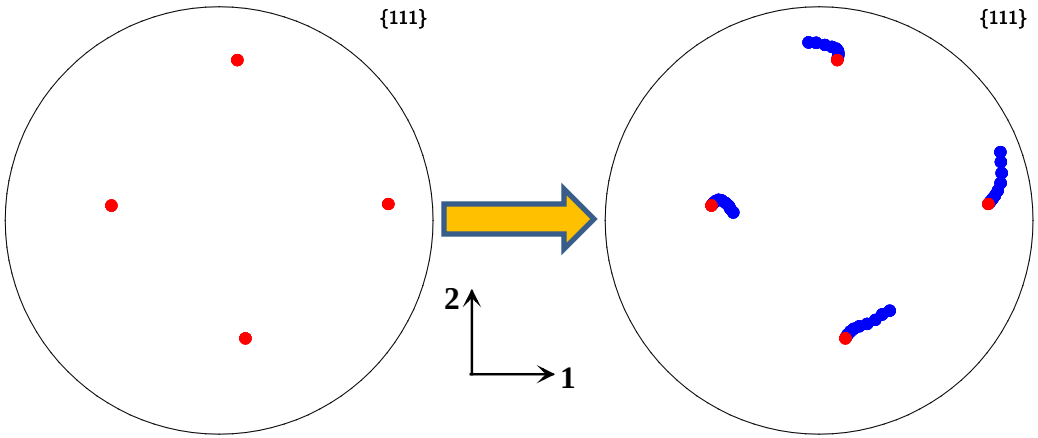
Crystal Plasticity FEM: The Mechanical Response and Texture Evolution of FCC Single Crystals / Polycrystals Using One-Element Simulations

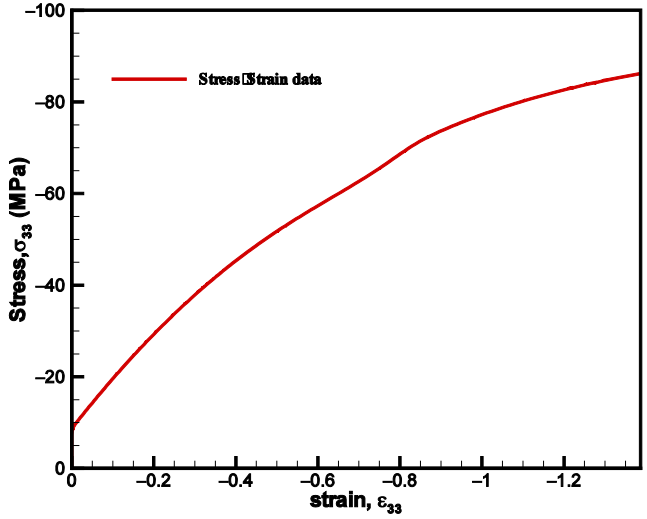
Q. Ma, E.B. Marin

1. Single Crystal Simulation

Uniaxial Compression, 75%.





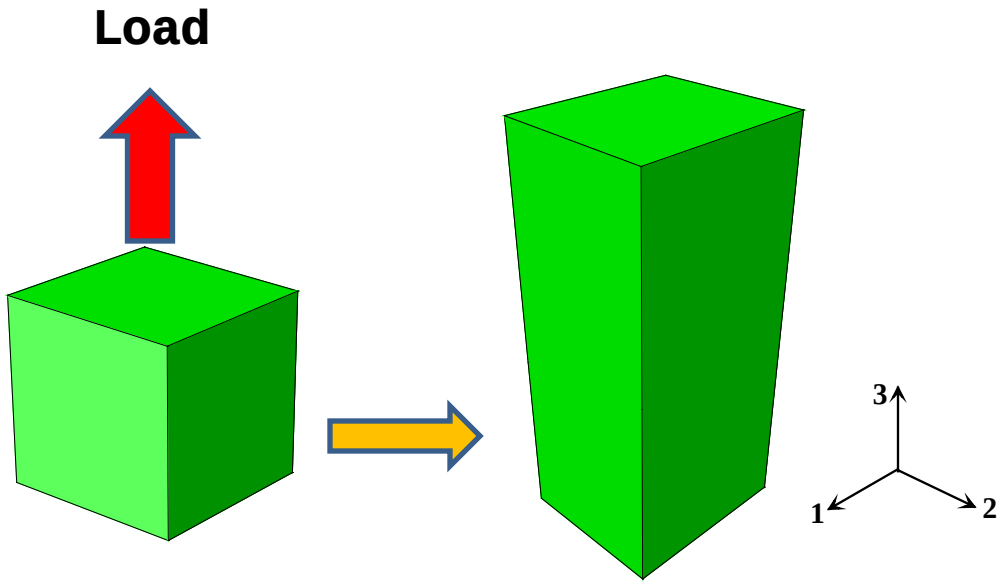


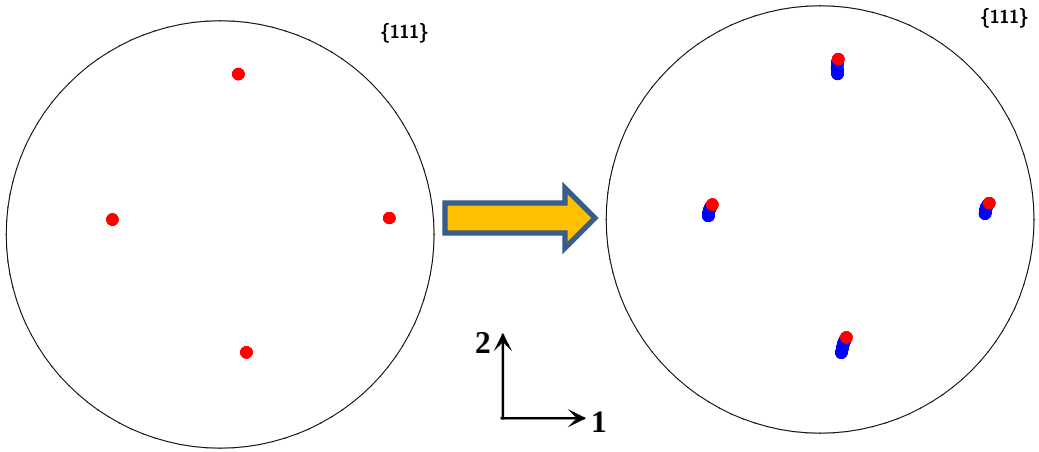
Initial orientation {35°, 16°,79°}

Orientation rotation

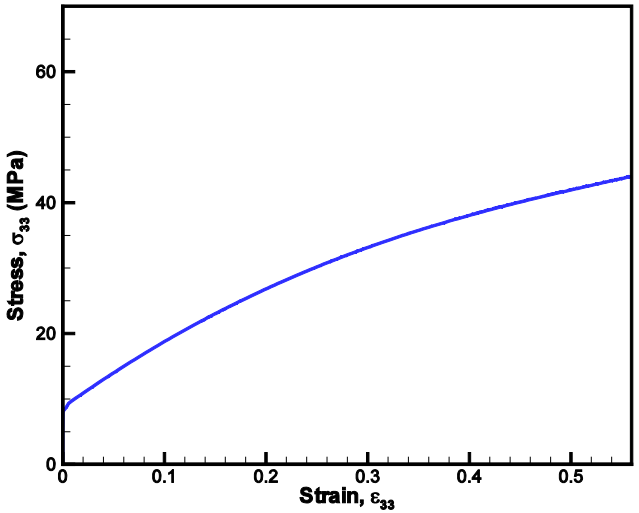
Stress-strain data

Uniaxial Tension, 75%.



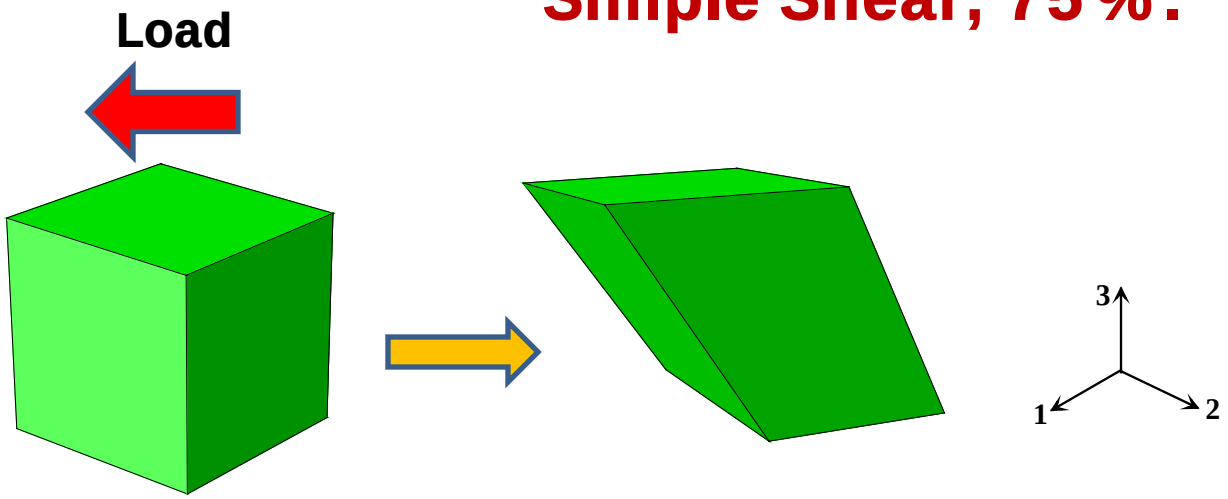


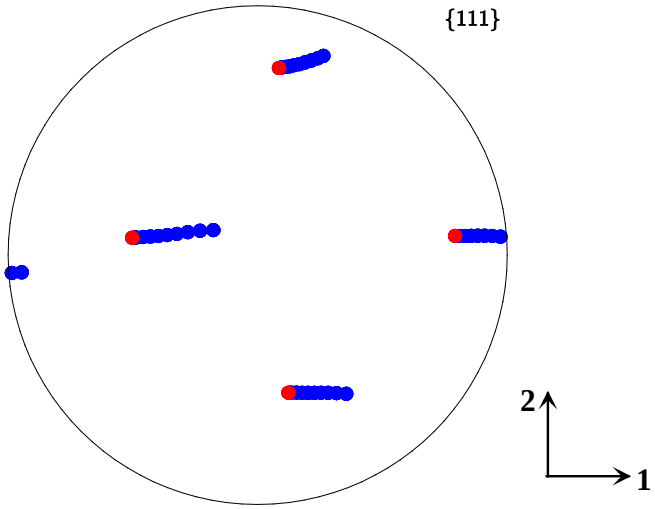
Orientation rotation

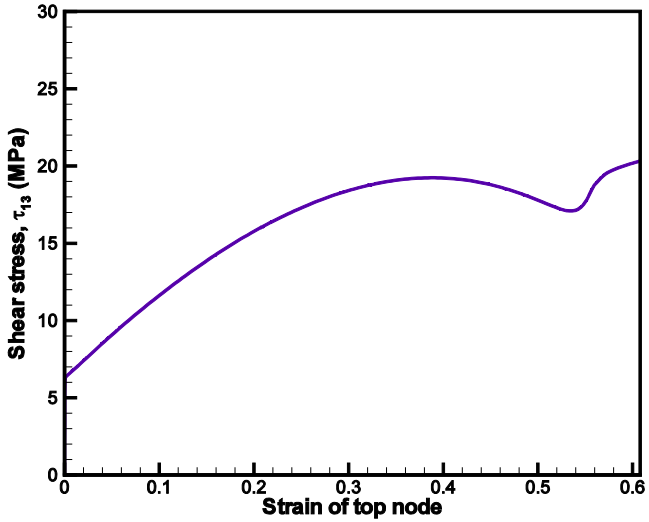


Stress-strain data

Simple Shear, 75%.



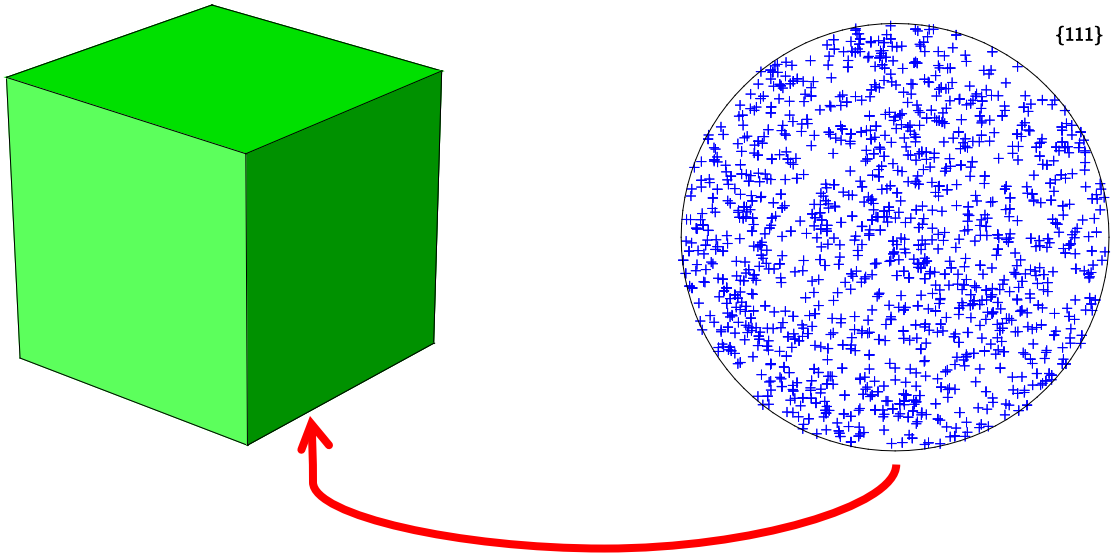




Orientation rotation

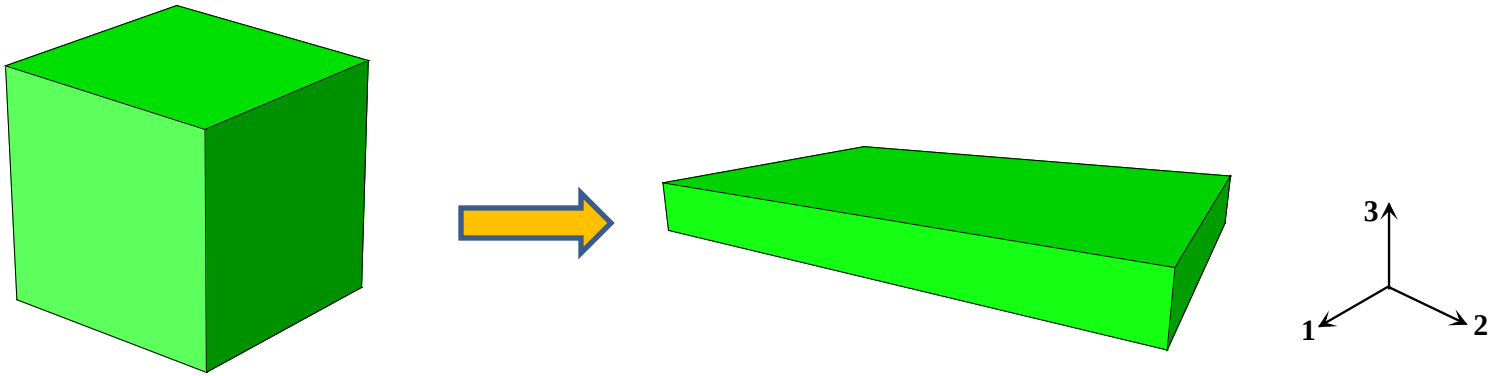
Stress-strain data

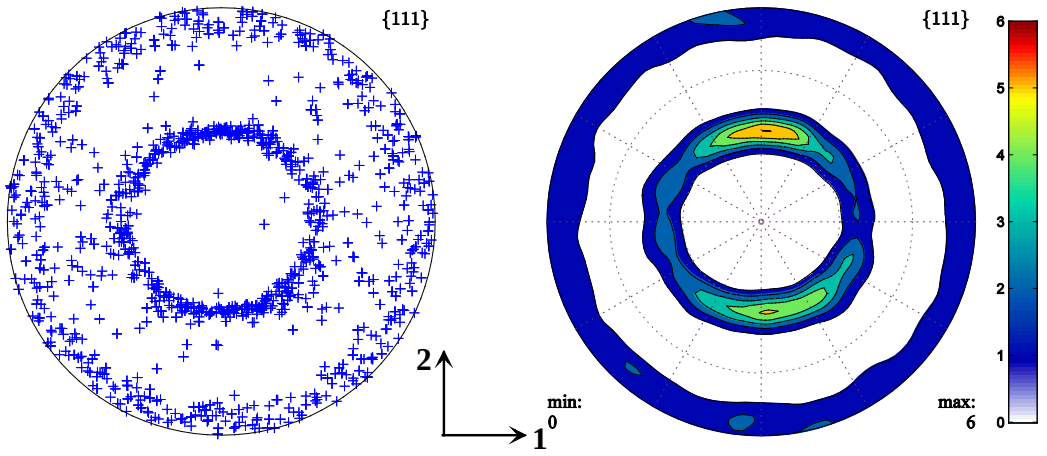
2. Polycrystal Simulation



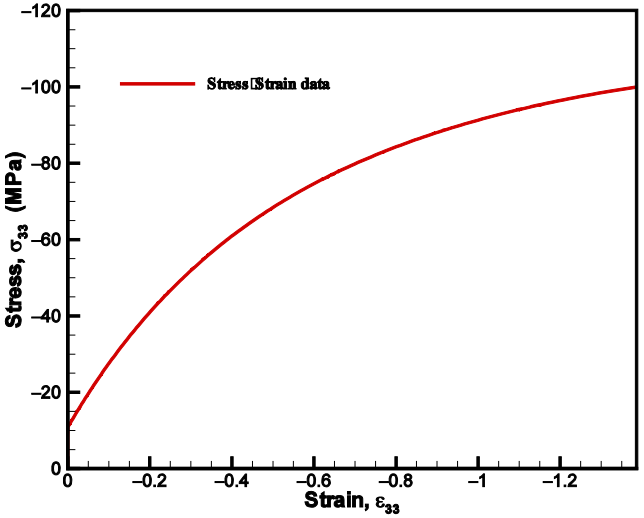
Polycrystal represented by 500 random orientations

Uniaxial Compression, 75%.



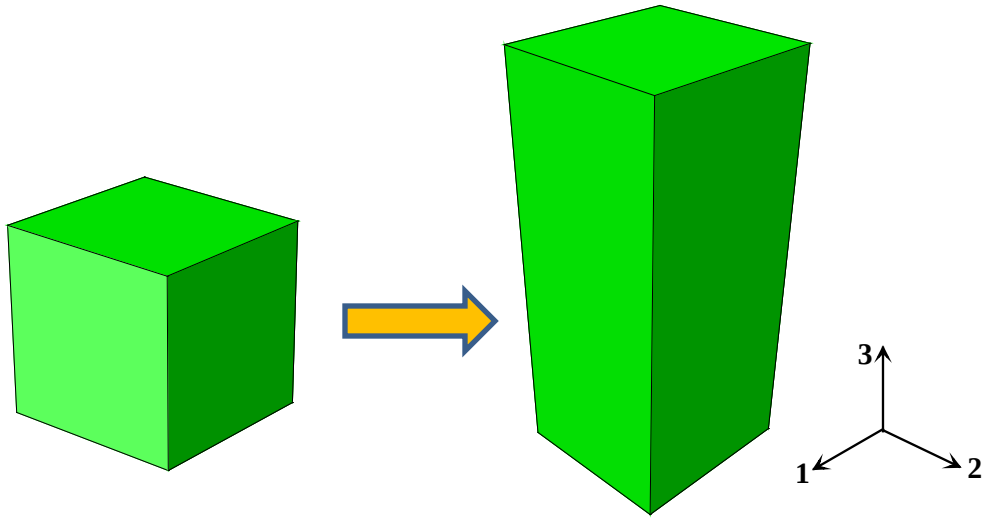


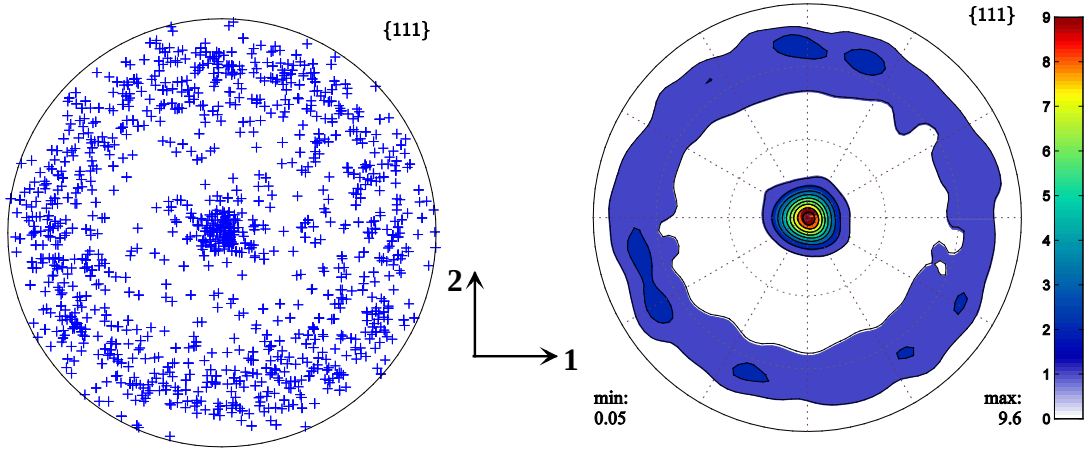
Deformation texture



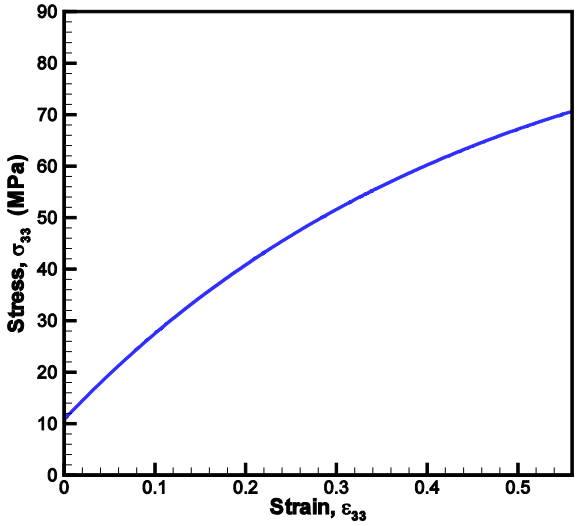
Stress-strain data

Uniaxial Tension, 75%.



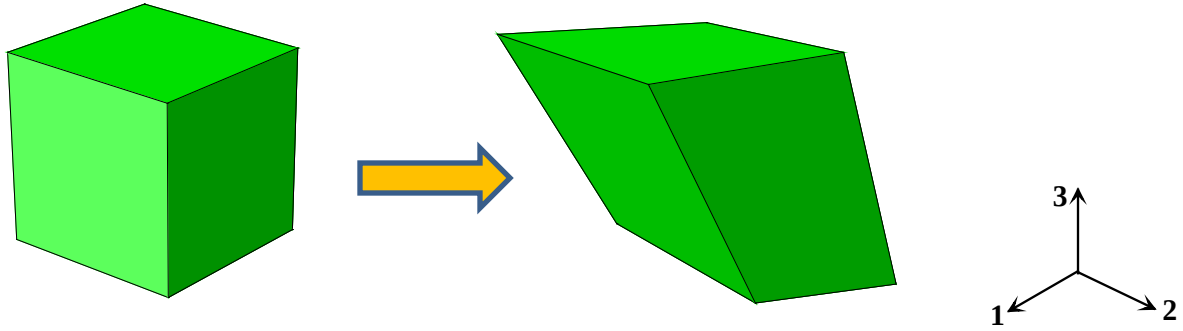


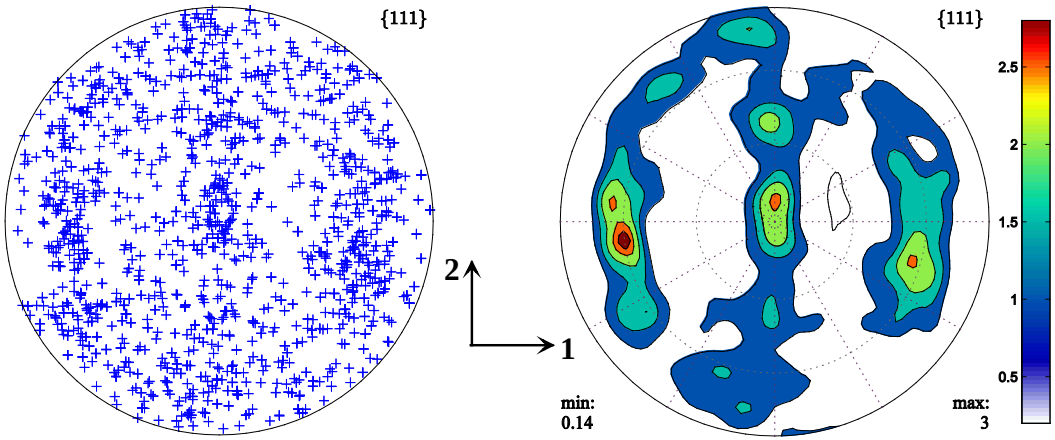
Deformation texture



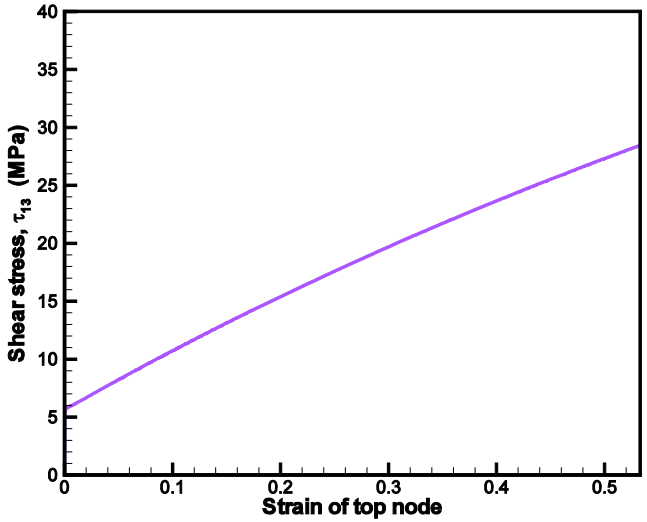
Stress-strain data

Simple Shear, 75%.





Deformation texture



Stress-strain data