



Modeling the mechanical behavior of bulk metallic glasses under deformation at local scale

Context

Metallic glass

Local atomic dynamics Mechanical properties



Properties of metallic glass

- High hardness
- High strength
- Corrosion resistance
- Abrasive resistance

Weakness

Low ductility at room temperature

Application



Aim

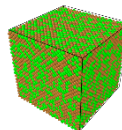
Research how to improve the plasticity of metallic glass with different conditions and different compositions at atom scale

Team (PVMH)

Method and tools

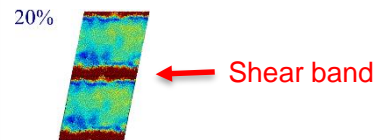
Molecular dynamics (MD) simulation

- ✓ Create the system of ZrCu metallic glass

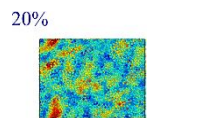


- ✓ Deformation tests

Shear tests and tension tests



Dynamic shear



Dynamic tension

Observation

- Relationship of stress and strain at different strain rates
- Generation of shear bands at different strain rates and different loop times
- Shear modulus and Young's modulus at different temperatures

Results

- Increase of yield stress with the increase of strain rates
- No effect during elastic region about strain rates
- For dynamic shear tests, it is more obvious to observe shear bands at lower shear rates
- Decrease of shear modulus and Young's modulus with the rise of temperature

