Abstract Submitted
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The effect of spherical inclusions in metallic glass nanowires under tensile test and its relation to atomic structure[1] MATIAS SEPULVEDA, GONZALO GUTIERREZ, NICOLAS AMIGO, Departamento de Fisica, Facultad de Ciencias, Universidad de Chile — The plastic behavior of crystalline metals is well understood. It is know that this regime is mainly mediated by nucleation and propagation of dislocations as well as by grain boundary sliding. In metallic glasses (MGs) the plastic behavior is quite different from their crystalline counterparts and a relationship between atomic-micro structure and properties remains one of the barriers that has hampered the progress to wide applications of MGs. In particular it would be desirable to have studies which directly relate the evolution of the shear bands (SBs) and glass matrix structure to each step of the applied strain, which would allow us to easily connect the evolution of the atomic structure to the stress-strain curve. Here we present a computational tensile test which shows the evolution of the atomic structure according to the strain is applied for a $Cu_{50}Zr_{50}$ metallic glass nanowire at 300 K with a Cu-Zr b2 inclusion in the center of the system with three different radius from 20 to 60 Å. The system consists of a million atoms and the local structure is analyzed by means of the Voronoi polyhedral technique and the nucleation and propagation of SBs by monitoring the local atomic shear strain.

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