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Computer Simulated Cold Welding of Gold Nanowires¹ EDISON DA SILVA, ZENNER PEREIRA, Institute of Physics “Gleb Wataghin,” UNICAMP, 13083-970, Campinas - SP, Brazil — Recently cold welding was achieved in gold and silver nanowires (NWs) with diameters in the range of 4 to 10 nm [1]. Since metallic contacts are of great importance in electronic devices, the ability of welding them without temperature change is quite remarkable and of interest. In the present work we use computer simulations to produce cold welding in gold NWs at room temperature. We used molecular dynamics with many body effective potentials based on the embedded-atom method EAM using the LAMMPS code to simulate first the breaking of gold NWs, the two produced NWs are then cold welded and similarly as the experiments, the newly welded NWs showed fcc structures as the pristine samples. The structural analysis is done with two independent methods [2] and strain stress curves of the breaking and welding are present. Our computer simulation compare very well with the experiments.

[1] Y. Lu, *et al.* Nature Nanotechnology 5, 218 - 224 (2010)

[2] E. Z. da Silva and Z.S. Pereira, Phys. Rev. B **81**, 195417 (2010).

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