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Evolution of Microstructure and Texture in Copper during Repetitive Extrusion-Upsetting and Subsequent Annealing

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The evolution of the microstructure and texture in copper has been studied during repetitive extrusion-upsetting (REU) to a total von Mises strain of 4.7 and during subsequent annealing at different temperatures. It is found that the texture is significantly altered by each deformation pass. A duplex ⟨001⟩+⟨111⟩ fiber texture with an increased ⟨111⟩ component was observed after each extrusion pass, whereas the ⟨110⟩ fiber component dominated the texture after each upsetting pass. During REU, the microstructure is refined by deformation-induced boundaries. The average cell size after a total strain of 4.7 is measured to be ~0.3 μm. This refined microstructure is unstable at room temperature as the presence of a small number of recrystallized grains in the deformed matrix. Pronounced

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