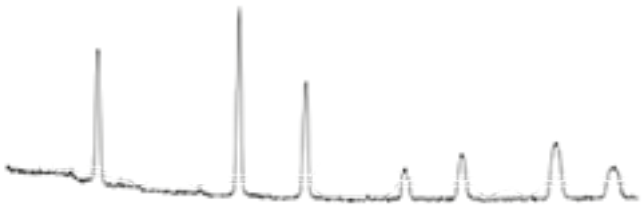

Contribution ID: **29** Type: **Talk**

Texture evolution of a graphene nanoparticles reinforced copper matrix laminated composites

Wednesday, June 1, 2022 4:05 PM (20 minutes)

The recrystallization texture that develops during annealing process of deformed polycrystalline metal is vital and largely responsible for the anisotropy mechanical properties of the materials. The origin of this kind of texture is always great source of scientific interests. Especially, for cube texture which is considered as a gift in fcc metals used as conductive materials like Cu, Al, etc., for many electrical and electronic devices, an extensive researches have already been conducted to investigate the formation mechanism of the cube texture. However, although lots of mechanisms have already been proposed, contradictions always appear by the results of different researchers. Thus, the formation mechanism of the cube texture in fcc metals is still in debate and worth thoroughly investigation.
In our work, graphene nanoparticles (GNP) reinforced copper (Cu) matrix laminated composites were fabricated through three steps consisting of electrophoretic deposition (EPD), hot-pressing sintering and hot-rolling process. The results from EBSD, neutron diffraction as well as synchrotron radiation all shows that when the raw copper foil thickness is 30μm, the Cu-GNP composites always obtain nearly pure cube texture, while the pure copper obtains coarse grains with random orientation. This may provide us a new technique to obtain highly textured material from polycrystalline materials and reveal the mechanism of the recrystallization and orientation monopolization mechanism of the laminated materials.

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Session Classification: Wednesday afternoon

Track Classification: Main