Tunable Functionality of Pure Nano Cu- and Cu-based Oxide Flexible Conductive Thin Film with Superior Surface Modification

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ABSTRACT

Flexible and soft conductive thin film using pure Cu and Cu-based oxide nanostructures equally benefit from the versatility of their assembling individual materials and robustness of device design components. Their small-scale soft conductive thin film made of curved elastomeric bilayers driven by the responsive forces acting by the embedded printed liquid of pure Cu and/or Cu-based oxide nanostructures channels carrying alternating currents of those compact integrated circuits. As such, the localised oxide growth of those complex multiphase thin film architectures is the empirical knowledge that guides to further understanding of many interrelated factors of their intrinsic multiscale physical-electro-chemical interactions characteristics. Although not much literatures have been reported on the soft, flexible pure Cu and Cu-based oxide nanostructured thin films, still, the compelling unusual shapes/forms/construct of such nanostructures in the preparation of those superior functionalities thin film using various curvilinear shapes would seem to establish a predominant foundation in technologically important MEMS/NEMS devices. Herein, this article attempts to summarise the recent advances, challenges, and prospects of employing pure Cu and Cu-based oxide nanostructures in both fundamental and applied tunable functionality of varying dimensionality. Also, special emphasis on the emerging related critical issues and outlook of technical challenges that pave to research improvement opportunities are included.

KEYWORDS

Conductive; Cu nanostructures; Cu-based oxide nanostructures; Flexible; Thin film

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