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DC magnetron sputtering deposition and characterisation of gold oxide thin filmsVincent Dolique¹, Pascal Brault¹¹GREMI UMR6606 CNRS-University Orleans, ORLEANS Cedex 2, France

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Gold oxide is used to make highly-valued cranberry or red-colored glass, which, like colloidal gold suspensions, contains evenly-sized spherical gold nanoparticles or is used in thin film technology. Recently, F. Machalett et al. [1] have shown a transformation of insulating gold oxide thin film, which under laser irradiation evolves into electrically conducting gold and have shown the possibility to fabricate electrical contacts in one step. However, this compound cannot be performed under conditions of equilibrium thermodynamics and the techniques to perform oxide gold thin films are not easy [2].

In this work, the deposition of gold oxide thin films is carried out at room temperature onto silicon and glass substrates by reactive magnetron sputtering in Ar/O₂ reactive atmosphere. Rutherford Backscattering Spectroscopy (RBS) analysis has revealed that the film is made of two layers with compositions Au_{2.6}O_{3.6} and Au_{1.7}O_{2.7} respectively. Moreover, these samples have been observed using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The latter has evidenced grains of 50 nm. Cross sectional observations by SEM have shown a multilayered structure of the first layer.

[1] F. Machalett, K. Edinger, J. Melngailis, M. Diegel, K. Steenbeck, E. Steinbeiss, Appl. Phys., A 71 (2000) 331

[2] E. Irissou et al. Thin Solid Films 472 (2005) 49- 57

Keywords

sputtering deposition

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