Abstract Submitted for the GEC13 Meeting of The American Physical Society

Steady-state mode of DC magnetron sputtering of mosaic coppergraphite targets¹ ALEXANDER PAL, YURY MANKELEVICH, MSU SINP, Moscow, RF, VALERY MITIN, VNIINM, Moscow, RF, TATYANA RAKHIMOVA, ALEXEY RYABINKIN, ALEXANDER SEROV, MSU SINP, Moscow, RF — Magnetron discharge provides broad possibilities for complex materials engineering, multicomponent coatings deposition in particular. Sputtering of the segmented or mosaic targets could easily create the necessary film composition. However the metal flux from the target can hardly be uniform. That is because removing a material is a ballistic process that considerably depends on many coupled processing parameters. The differences in the sputter yield of the different target segments should lead to non-uniform target erosion and distortion of the stoichiometry of a multi-element target material in the film. We investigated the magnetron sputtering of the mosaic targets containing materials with heavily different sputtering yield, namely copper and carbon. The mosaic targets consisted of copper disks with cylindrical graphite inserts. The relative area of the inserts was varied. It was found, that after transition regime an operational mode with equal erosion rate of metal and graphite elements were established. The ion flow redistribution due to graphitic insets protruding above the copper surface and the graphite sputtering yield increase due to Cu and Ar implantation can explain the effect of sputtering rate equalization for mosaic copper-graphite targets. The same processes should take place at sputtering of mosaic targets with small inserts of any composition.

¹The work was supported by RFBR grant #13-02-01161.

Alexander Pal MSU SINP, Moscow, RF

Date submitted: 13 Jun 2013

Electronic form version 1.4