In-situ resistivity measurements during growth of ultra-thin $Cr_{0.7}Mo_{0.3}$

Kristinn B. Gylfason[1], Árni Sigurður Ingason[2],
Jón Skírnir Ágústsson[3,4], Sveinn Ólafsson[2], Kristinn Johnsen[4]
and Jón Tómas Guðmundsson[2,3]

[1]Lyfjaþróun hf, Vatnagarðar 16 - 18, IS-104 Reykjavík, Iceland
[2]Science Institute, University of Iceland,
Dunhaga 3, IS-107 Reykjavík, Iceland
[3]Department of Electrical Engineering, University of Iceland,
Hjarðarhaga 2 – 6, IS-107 Reykjavík, Iceland
[4]Mentis Cura ehf, Vatnagarðar 16 - 18, IS-104 Reykjavík, Iceland

Abstract

Recently there has been a growing technological interest in ultra-thin metallic conducting layers. The growth of ultra-thin, lattice matched, $Cr_{0.7}Mo_{0.3}$ films on an MgO substrate, in a dc magnetron discharge, was investigated by *in-situ* resistivity measurements in order to determine the minimum thickness of a continuous layer. The thickness dependence of the resistivity shows a coalescence thickness of less than two monolayers indicating layer by layer growth of the films. We compare the resistivity of the films to a combination of the Fuchs-Sondheimer and the Mayadas-Shatzkes models, assuming a thickness dependence of grain size. The model indicates that grain size increases with increasing growth temperature.