

Effects of a Dead Layer at the Film-substrate Interface on the Microwave Surface Resistance of MgB₂ Films

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MgB₂ films with stoichiometric composition often have a dead layer at the film-substrate interface with the layer thickness being as large as 30-50 nm. While studies on the effect of non-stoichiometric Mg-rich top layer on the microwave properties revealed that the microwave surface resistance R_s could decrease significantly after the top layer is removed by ion milling, roles of the dead layer on the R_s are little known. Here we study effects of the dead layer by comparing the RS values of MgB₂ films determined with and without consideration of the dead layer with each other. Impedance transformation method is used to assess effects of the dead layer on the R_s . Attempts are made to explain effects of the dead layer on variations in the R_s after repeated ion milling of MgB₂ films.

Keywords: MgB₂, dead layer, R_s , impedance transformation method