Modeling and initial growth mechanism of thin film by measurement method of electrical conductivity of substrate (SC model)

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A model of electrical conductivity as a function of average thickness of depositing material on resistive or semiconductive substrate was suggested at initial growth range before beginning electrical conductivity by tunneling effect. According to the above model, the conductivities in the cases of two dimensional(2-D) growth or of the growth by increase of island number(n) increase with the average thickness(d), and that by three dimensional(3-D) growth is proportional to a $d^{2/3}$. The total conductivity was expressed by $C_{rx} \cdot d + C_{n(1-x)} \cdot d^{2/3}$. By comparison of the coefficients value, six different growth types such as 2-D, island number increase, 3-D, coalescence, and columnar structure were well discriminated.