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Evolution of sheet resistance of thin Ni film deposited on porous anodic alumina substrate

Aree Song, Chul Sung Kim, and Taejoon Kouh[a)]
Department of Physics, Kookmin University, Seoul 136-702, Korea

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We have investigated the evolution of sheet resistance of thin nickel films, thermally evaporated on porous alumina substrates, based on *in situ* electron transport measurement. By comparing the porous films, having various surface area fractions, to the uniform film, following the scaling law in metal-insulator transition, we have been able to describe the growth and the resulting thickness-dependent sheet resistance of the porous film in light of the two-dimensional percolation model. The underlying pore array strongly affects the appearance of the film conductance, and the study suggests the possibility of modulating the electron transport characteristics with the constrained surface geometry. © *2011 American Institute of Physics*. [doi:10.1063/1.3672211]