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Abstract

This study presents a process for growing a Cu seed layer on Ta/SiO2/Si substrate using an electroless plating (ELP) process at an extremely low temperature (~30℃). In this process, the activation treatment of Ta/SiO2/Si substrates was carried out by immersion in a PdCl2/HCl solution prior to electroless Cu deposition. The optimum activation time for the substrate was clearly observed to be 7 minutes. The Cu seed layer was uniformly and smoothly deposited in 30 mM CuSO4 concentration for 80 seconds with an average roughness of 14 nm under a thin film 50 nm thick. The grain size of the Cu seed layer was 34 nm. After annealing in hydrogen ambience at 250~350℃, the average roughness of the Cu seed layer was reduced to 4 nm. A proposed mechanism for the ELP of Cu seed layers on Ta/SiO2/Si substrates is also presented.
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