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Synthesis of Cu/Ni thin film by thermal evaporation technique and its XPS study

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Abstract : In this article, the synthesis of Cu/Ni bilayer thin film and surface sensitivity of XPS technique has been discussed. To understand surface sensitivity of XPS technique, Cu/Ni thin films were prepared by thermal evaporation technique. Nickel metal of purity 99.99 % is deposited on silicon (100) substrate by thermal evaporation method. Then copper metal of purity 99.99 % is deposited on top of the Ni layer. The thickness of the nickel is about 40 nm on the silicon and the thickness of Cu on Ni is about 30 nm. It is experimentally observed that in such a situation the XPS signals due to the substrate (both Ni and Si) are rapidly attenuated, while those due to the condensed evaporator (Cu metal) simultaneously increase to limiting value. The intense peaks of Cu compare to Ni confirm that XPS technique is very surface sensitive.

Keywords: X-ray photoelectron spectroscopy (XPS), parts per million (ppm), Spin-Orbit-Splitting (SOS)

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