Investigation of Si island formation through Cu grain boundaries by SPM and SEM methods

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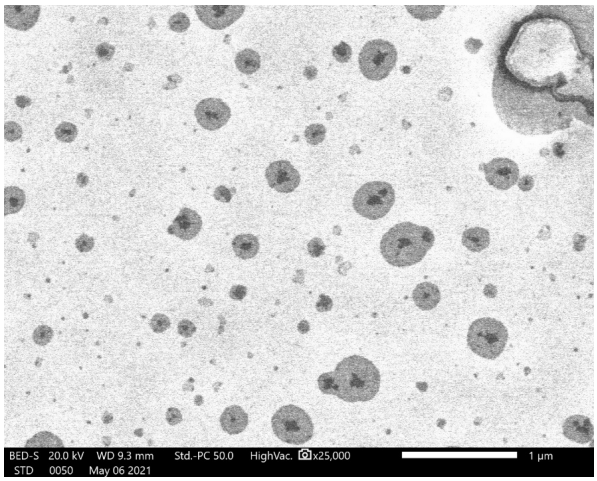
Silicon island formation on top of a polycrystalline copper layer was studied with Scanning Probe Microscope and Scanning Electron Microscope in the 403-453K temperature range. Onto silicon single crystals, 80 nm amorphous silicon and 40 nm copper was deposited successively. Scanning Electron Microscopy and Scanning Probe Microscopy methods experimentally proved, that heat treatment of the samples causes silicon atom migration though the grain boundaries of the upper copper layer, resulting in silicon island formation instead of a continuous Si layer on the Cu surface. Surface coverage of the Si islands were up to 30%. These results show good correlation with our recent Low Energy Ion Scattering measurements, as well as with the previous one [1].



[1] E. Bodnar, V. Takats, T. Fodor, J. Hakl, Yu. Kaganovskii, G. Yang, X. Yao, K. Vad, Vacuum, **2022**, *203*, 111260