Kirkendall effect on the nanoscale

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Kirkendall shift has been studied experimentally as well as theoretically for decades already. There are theoretical indications, that the Kirkendall effect must operate from the beginning of the diffusion process but there are practically no measurements on this short time and lenght scale. For that reason, diffusion on the nanometer scale was investigated experimentally the in different binary systems in thin film geometry. We followed the diffusion process as well as the Kirkendall effect by different methodes (TEM, SNMS and synchrotron X-ray waveguide technique). Investigations were performed in systems with complete soubility (BiSb, CuNi, BiSb) as well as in systems forming intermetallic phase (FeSb, FePd). It was found that with these methodes the Kirkendall shift can be well followed on the nano-scale. In FeSb system even the bifurcation of the Kirkendall plane was observed.