Abstract

Ion-beam irradiation has been extensively used to induce mixed layers and phases formation in the metal–metal and metal–silicon systems. Rutherford backscattering spectrometry (RBS) is currently used to investigate the mixed layers. In such studies, it is important to know the depth profile of each atomic species of the mixed layer. For this purpose, a simple method for the determination of the atomic fraction of each element at a given depth of the mixed layer is described. This method does not need a previous simulation of the experimental RBS spectrum. The atomic depth profile is directly extracted from the experimental data. The atomic fractions are deduced from the backscattered yields of the elements at each channel. The obtained values are used to estimate the thickness of the slab which is equivalent to one channel. The examples of depth profiles of Au, Cr and Si atoms are presented and discussed for the mixed layers of Au/Si and Cr/Si systems induced by Ar^+, Kr^+ and Xe^+ ions at the fluences ranging from 1×10^{16} to 3×10^{16} ions/cm^2.