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Secondary ion mass spectrometry (SIMS)

It is a technique first time used in 1949 and improved in 1960 to characterize sample surfaces. The principle is rather easy. The surface is bombarded with a primary ion beam. During that process atoms and molecules from the surface getting knocked out and partly ionized. These so called second ions, which contain the information from the sample, are guided by a lenses system through a mass analyser onto a detector. By using adequate conditions for the mass analyser one can choose ions of a determined energy and mass and so collect for example a mass spectrum. One can not only do surface spectroscopy but also surface imaging – so one is gathering position information, or even depth profiling is possible. The achieved resolution for the used setup in the house is about 1μm lateral and few nm in depth. The detection limit is 1ppb.