NANOSTAR:
A IN SITU COMBINATION OF SMALL-ANGLE X-RAY SCATTERING (SAXS) AND X-RAY FLUORESCENCE (XRF)

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The commercially available NanoSTAR system is a device for fast and easy 2D position-resolved SAXS measurements and data evaluation, based on a combination of latest x-ray optics technology (Göbel Mirrors), precisely machined mechanics (optical bench with pinhole collimators, sample changer and primary beam stop), a two-dimensional detector (HI-STAR) and a powerful software package (SAXS NT). With the NanoSTAR it is possible to determine the size, size distribution, orientation and shape of scattering particles in various kinds of samples (alloys, polymers, biological samples,...) in the range from a few Å up to 800 Å.

Recently, this system was combined with an XRF detector, thus giving information on the elemental composition in the range from % to ppm for elements up to Co via K-lines (using Cu-excitation) and for the medium-Z elements up to the Lanthanides via L-lines. With this set-up it is now possible to perform a position-resolved determination of structural parameters and elemental composition – a combination of two well-established complementary techniques, which has never been built before in that way. (2 systems in one !)

First experiments will be performed on bone samples, which are very inhomogeneous due to their hierarchical structure. Together with a two-dimensional scanning stage the XRF signal will give the mineral composition on defined sample spots whereas SAXS gives the mineral particle size and arrangement. These investigations will be important for studying bone formation process.