MULTILAYER OPTICS FOR NANOSTRUCTURE INVESTIGATION IN THE LAB, THE EXAMPLE OF HIGH Z ELEMENTS

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To efficiently illuminate a sample for structural investigation is a permanent concern. The main x-ray based techniques used to characterize the nanostructure of colloids, polymers, and most suspensions are based on the small angle x-ray scattering (SAXS). As a reason, the goal is to obtain the most intense flux with very low level of divergence. The practical geometry of SAXS applications being the transmission mode, the case of high-Z elements-containing specimen is even further complicated due to the strong absorption along the beam path in the sample. As a reason, Molybdenum radiation has to be used with more stringent requirements for X-ray optics and reduced X-ray source brightness compared to Copper radiation. The challenge for multilayer optics becomes two-fold: reduced solid angle of collection due to smaller bragg angles and reduced source size acceptance due to reduced rocking curve width for higher energy radiations.

The aim of this poster is to present recent development of new multilayer optics in the field of SAXS applications and for High Z elements in particular. We will also present results acquired at the Institute for Separation Chemistry of Marcoule with a Mo microfocus sealed tube system for characterization of organic, inorganic and hybrid nuclear materials in the course to develop nuclear energy for the future.