

# Fitting a complex layer stack: Optical constants and interlayer roughness from soft X-ray measurements

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Soft X-ray reflectometry is a reliable and versatile tool to investigate semiconductor nanostructures. We here present synchrotron-based soft X-ray reflectometry measurements on stacked thin film samples of silicon and silicon-germanium (SiGe) in various concentrations as they are produced for CFET applications. The measured data sets of angle- and energy-resolved broadband reflectance can be mathematically described through a matrix-method approach that describes reflection, absorption, and diffuse scattering of off the interfaces. Both, the optical constants of materials and the geometrical parameters of the layer stack including the interfacial roughnesses are model parameters that can be determined through a data fit. We discuss the optical constants of the different SiGe thin films as well as the retrieved roughness in between the layers.