Micro-XANES: A tool for the analysis of copper impurities in photovoltaic polycrystalline silicon

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X-ray beam diameters of one micrometer can be obtained at the BAMline at the storage ring BESSY II in Berlin using compound refractive lenses (CRL). The accepted beam size for the lenses is (140 x 140) μm^2, thus the gain in the spot is about 15000. The application of such lenses in X-ray fluorescence spectroscopy (XRF) and X-ray absorption near edge spectroscopy (XANES) on grain boundaries of photovoltaic polycrystalline silicon yields information about impurities and their chemical states. It is certain, that impurities, such as metals, can dramatically decrease charge carrier lifetimes in solar cells. The efficiency of this analytical tool will be demonstrated on p-type polycrystalline silicon.