

Current achievements in thin-film fabrication at HZG

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Advanced research light sources, such as free-electron lasers (FELs) and synchrotron sources, require ultra-precise optical elements such as X-ray mirrors consisting of single, double, triple and multiple layers. Current achievements in X-ray mirror fabrication will be shown to demonstrate possibilities and restrictions of thin-film preparation using magnetron sputtering. Currently, the most important coating materials are boron carbide, carbon, ruthenium and tungsten at HZG. [1-4] Thin-film specimens were investigated by X-ray reflectometry (XRR), X-ray diffraction (XRD), transmission electron microscopy (TEM), X-ray fluorescence spectrometry (XRF), atomic force microscopy (AFM) and optical interferometry in order to optimize the physical layer properties such as layer thickness, interface roughness, slope error, film morphology, microstructure, internal stress, thermal and radiation stability for distinct thin-film applications.

References

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