

Recent advances in synchrotron radiation X-ray micro- and nano-beams for materials characterization

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Synchrotron radiation X-ray micro- and nano-beams are emerging characterization tools with broad implications for science, ranging from solid state physics to structural biology. In the field of materials characterization, they are becoming a key tool for the space-resolved determination of structural (XRD) and electronic (XANES/EXAFS) properties and for chemical speciation (XRF) of nano-structured or composite materials [1].

In this contribution, recent advances in focusing devices available at III generation synchrotron radiation sources will be briefly reviewed and selected applications will be afterward presented. In particular, three different examples will be more deeply discussed: (i) the complete characterization of a Multi-Quantum Wells Electroabsorption-Modulated Laser [2-5], employed in high frequency optical communications over long propagation spans; (ii) the structural investigation of superconducting wickers [6,7]; (iii) the $\text{Fe}^{3+}/\Sigma\text{Fe}$ variations in a strongly zoned garnet crystal, which is an ideal monitor of the redox processes associated to devolatilization reactions occurring in the subducting slab [8].



References

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