

Synchrotron radiation in Materials Science: from pharmaceuticals to smart materials

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Synchrotron radiation sources were developed and successfully brought on line beginning in 1960's. High brightness and high intensity, many orders of magnitude larger than conventional sources, are some of the characteristics of them. The advantages of using synchrotron radiation for spectroscopy and diffraction studies have been realized by an ever-growing scientific community. Brazil has the first synchrotron radiation source in the Southern Hemisphere, located in Campinas, SP, which is opened to the Brazilian scientific community and, more generally, to the Latin America one.

In this talk some results obtained at the X-ray Powder Diffraction Beamline (D10B-XPD)¹ and at the X-Ray Absorption Spectroscopy II Beamline (D08B-XAFSII) of the LNLS will be presented. Among them, a great variety of pharmaceutical polymorphs could be simultaneously identified and the quantification of such polymorphs was obtained by X-ray powder diffraction data and the Rietveld method.² *In situ* high-temperature studies for tailoring new materials (solid solutions of molybdates and tungstates that present negative thermal expansion and oxygen-ion conductors based on the mixed oxide Ba₂In₂O₅) were conducted and some ongoing investigations are in process. Finally, the application of synchrotron radiation on the study of "smart windows", which dynamically modulate the passage of light, by means of X-ray absorption spectroscopy and X-ray diffraction experiments, will also be discussed.

Keywords: Synchrotron radiation, Materials Science, pharmaceuticals, smart materials.

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