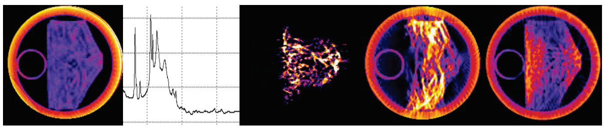
Keywords: X-ray diffraction analysis programming, KOSSEL diffraction, XRT technique

FA5-MS40-P07

Pressure anisotropy on C60-graphite transformation seen by diffraction-tomography. Jean-Louis Hodeau [a], Michelle Alvarez-Murga[b,a], Pierre Bleuet[c], Mohamed Mezouar[b], Remi Tucoulou[b], Christophe Lepoittevin[a], Nathalie Boudet[a], Jean-François Berar[a], Leonel Marques[d], [a]*Institut Néel, CNRS-UJF, 38042 Grenoble, France*, [b]*ESRF, BP 220, 38043 Grenoble, France*, [b]*CEA /LCPO & CEA-LETI, Grenoble 38054, France.* [b]*Univ Aveiro, Dept Fis, Ciceco, P3800 Aveiro, Portugal*
E-mail: hodeau@grenoble.cnrs.fr

The advent of heterogeneous and textured material calls for development of local structural probes to characterize them. The anisotropy of local heterogeneities, crystalline orientations and hierarchical architectures influences their macroscopic physical properties. This feature arises from the processing and thermo-mechanical history of the material and exists in natural and synthetic multiphase materials as diverse as biological tissues (bone, tooth), cements, nano-materials, alloys, pigments, mineral products or materials synthesized at high-pressures like carbon 3D zeolites [1].
Here we show the potential of “diffraction tomography” (XRD-CT) to study both phase and crystalline orientation distributions. This method has been recently demonstrated on multiphase materials provided some conditions are fulfilled [2]. Presently, the demonstration is performed on a textured heterogeneous C60polymer-graphite pellet obtained by high-pressure (5 GPa, 1100K) treatment using a Paris-Edinburgh cell setup [3]. In-situ XRD synthesis-measurements were done at beamline ID27 and “diffraction-tomography” experiments were performed at beamlines ID22 and BM02 at the ESRF. The spatial resolution of the probe has been tailored to be compatible with the grain size of the crystallized material, and beam sizes were 2×1 μm^2 and 100x100 μm^2 using 18 keV energy. Our results present both sample and texture orientation relationships as a function of the pressure direction.



Furthermore “diffraction-tomography” allows the extraction of known and unknown scattering patterns of amorphous and crystalline compounds with similar atomic densities and compositions. It can be carried out simultaneously with X-ray fluorescence, Compton, and absorption tomographies, allowing a *multi-modal* analysis of prime importance in materials science, geology, paleontology, cultural heritage and medical science, textured materials. textured materials.

[1] L. Marques et al. Debye–Scherrer ellipses 3D fullerene polymers: An anisotropic pressure memory signature. *Science* 1999, 283, 1720.
[2] P. Bleuet, E. Welcomme, E. Dooryhée, J. Susini, J.L. Hodeau, P. Walter, Probing the structure of heterogeneous diluted materials by diffraction tomography, *Nature Materials* 2008, 7, 468.
[3] G. Morard et al. Optimization of Paris–Edinburgh press cell for in situ monochromatic X-ray diffraction and X-ray absorption, *High Press. Res. 2007,* 27 , 223.

Keywords: diffraction-tomography, texture, fullerenes

FA5-MS40-P08

Conditions for reception of x-ray monochromatic bunches of the maximum intensity in geometry Laue.
V.V. Margaryan, K.T. Hayrapetyan, S.N.Noreyan, *X-Ray Pungs Laboratory. Yerevan, Republic of Armenia*
E-mail: x-ray@web.am

In the presented work dependence of absolute value of intensity of monochromatic x-ray radiation, diffracted from a direction of a incidence primary bunch in a reflection direction in geometry Laue in the presence of external influences (a condition of a full pumping), from a thickness of a single-crystal is investigated. As is known, the angular width of a full pumping x-ray bunch, in the presence of external influences, depends as on a thickness of a single-crystal (t) [1], and from distance a radiation source - a sample [2]. At the fixed distance a radiation source - a single-crystal in process of increase in a thickness of a single-crystal the angular width of a full pumping x-ray bunch linearly increases.
From the previously mentioned follows, that with increase in a thickness of a single-crystal the sizes of angular area of a full pumping from a direction of a primary bunch in a reflection direction increase, integrated intensity of the reflected bunch therefore increases.
On the other hand, the increase in a thickness of a single-crystal leads to increase in the integrated intensity absorbed by a single-crystal. It is natural to assume, that in the described conditions, changing a thickness of a disseminating single-crystal, it is possible to find that optimum thickness at which the absolute value of a full pumping x-ray bunch in a direction of reflection will be maximum.
As a result of the detailed analysis of results of an experimental research it is shown, that the absolute size of integrated intensity full pumping from a primary direction in a direction of reflection of a x-ray bunch reaches the maximum at condition observance: $\mu t=1$, where μ - factor of linear absorption, t - a thickness of a single-crystal.
The validity of the given condition is confirmed also by theoretical calculations.

[1].С.Н. Нореян, В.К. Мирзоян, В.Р. Кочарян., Зависимость угловой апертуры полного перебрасываемого рентгеновского излучения от толщины монокристалла при наличии температурного градиента. Известия НАН Армения, Физика, 2004, Т.39, N2, С.124-130. [2].V.V. Margaryan, K.T. Hayrapetyan, S.N. Noreyan, The Peculiarities of Angular Width of Diffracted X-Rays at The Presence of Temperature Gradient, Acta Cryst. 2009. A65, s214

Keywords: X-ray diffraction, X-ray absorption, X-ray single-crystal diffraction

FA5-MS40-P09

Probing inclusions in diamonds with fine beams of synchrotron X rays Moreton Moore[a], Rais Shaikhaidarov[a], Victor Petrashov[a], Fanus Viljoen[b], [a]*Physics Dept, Royal Holloway University of London, UK*, [b]*Geology Dept, University of Johannesburg, South Africa*
E-mail: m.moore@rhul.ac.uk