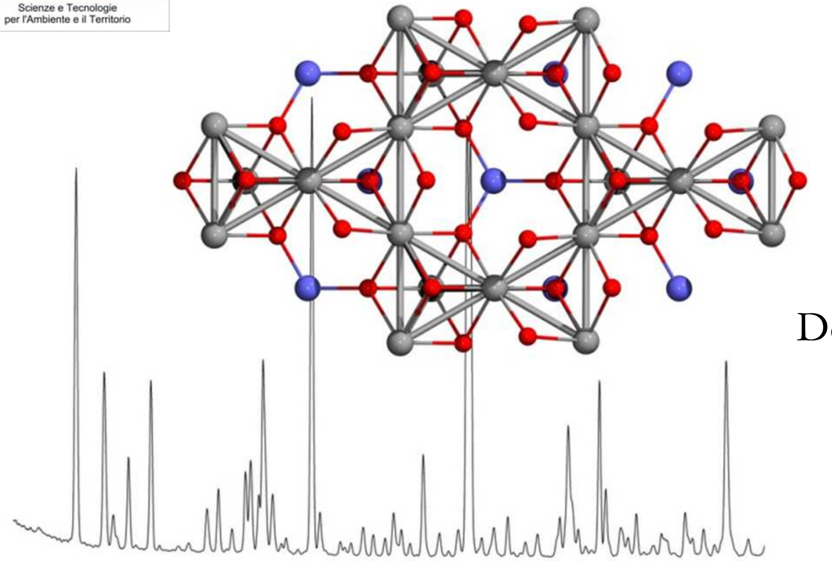
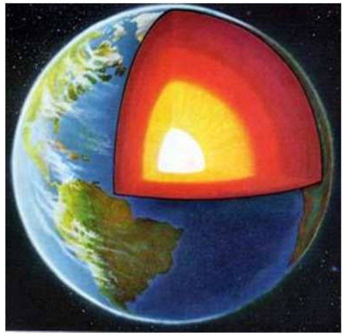
Potentials of the modern X-Ray Diffraction and their application in the analysis of complex natural and artificial materials





Tonči Balić-Žunić

Department of Geosciences and Natural Resource Management, University of Copenhagen

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The turn of the century has seen a historical improvement in X-Ray Diffraction (XRD) technique due to the introduction of novel detector types. Their so far mostly exploited advantage is an unprecedented speed of data acquisition, which highly increased throughput of the technique and opened it to a much larger scope of users interested in identification of solid phases and their crystal structure. The new modes of data acquisition have other potentials than speed, specifically interesting for the analysis of complex and complicated samples that are typically encountered in Geosciences and various parts of Materials Science. Our XRD research group worked during the past twenty years on improving the analyses of bulk natural and man-made materials, complex mineral intergrowths and structural changes of solids under varying temperature and pressure, all of which can gain from the new instrumental and computational advances. In this lecture I shall present the developments we made that improved our quantitative analysis of multiphase mixtures, extraction of crystal structure data from single multiphase grains and the analysis of crystal structure changes in the high-pressure DAC devices.