

39th NARECOM – NAnoEnviCz REsearch COmmunity Meeting

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9th October 2024 from 2:30 p.m.

**Application of X-ray diffraction in material analysis**

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**Abstract:** X-ray diffraction (XRD) is non-destructive powerful experimental technique with broad range of applications in the field of material science as well as industry. XRD is based on interaction of X-ray radiation with atoms in the matter. It can provide qualitative and quantitative information about composition of crystalline phases, calculate crystallite size, crystal structures and its parameters and determine ratio of amorphous and crystalline content. Aside, non-ambient XRD can shed light into mechanisms and kinetics of structural and phase transformations induced by elevated temperature and/or environment (like gas, pressure, etc.). The other application closely related to XRD is Small Angle X-ray Scattering (SAXS), which provides information about size and morphology of nanoparticles. Additionally, all these analysis of powder samples can be done under inert conditions which is especially useful in the case of non-ambient XRD – non-stable prepared materials can be transferred to glovebox and subsequently to other characterization techniques directly without contact with air.

**Graphical Abstract:**



**1 µm**