

APPLICATION OF SMALL ANGLE X-RAY SCATTERING IN INDUSTRIAL MATERIAL RESEARCH

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Small angle X-ray scattering is able to provide important insight into changes in electron density distribution in bulk materials on a mesoscopic length scale. Since bulk properties of polymers or resin materials are determined by molecular assemblies rather than individual macromolecules, the interpretation of SAXS patterns from such systems can provide insight in the morphology relevant for ultimate material properties. Even if material formulations are usually based on a number of different components and in general subjected to a complex processing history, SAXS can provide important insights during the material development phase. As a consequence, the field of nanomaterials has opened as an important new application field. Several examples, emerging from SAXS applications in the nanocomposite and coating area will be discussed. An interesting aspect in that respect is the possibility to perform in-situ studies on materials under the influence of external fields, directing the subsequent growth of polymeric assemblies in a given environment.