

## **Development of materials, processes and products for nuclear sector: Role of basic sciences**

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Nuclear technologies rely on specialized materials which need stringent requirements of chemical and thermodynamical stability as well as isotopic purity criteria. Thus, the growth of nuclear sector is closely dependent on the development of indigenous materials, processes and products, and hence the understanding of basic science plays an important role in development of specific materials and processes for targeted applications. The concepts of chemistry, thermodynamics, processing, crystallography and defects engineering often play important roles toward the development of such materials. This presentation is intended to showcase some of research activities at Chemistry Group, BARC carried out towards nuclear applications. Several examples of development of materials for nuclear back-end and front-end will be discussed. Nuclear safety is another crucial area where substantial research has been conducted. Efforts towards the development of several important products will also be covered. A few examples of tailored materials for possible application in nuclear extreme will also be discussed. This presentation will be mainly focused to highlight the role of underlying science behind these process, materials and products.

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