Advancing Materials Science through Ion Beams

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The modification of materials through ion beams offers potential for advancing recyclable and sustainable materials. In this presentation, we explore innovative applications of ion beam techniques provided by ReMade@ARI, emphasizing their role in material engineering. Special attention will be given to lesser-known radiation types, particularly low-energy ion beams utilized for nanoscale self-assembly patterning such as surface functionalisation and substrate design, enabling the development of miniaturized sensors and catalysts. Additionally, we address high-energy swift heavy ions that induce the formation of distinctive ion track, and how they have been explored for membrane engineering. We will look into the physical mechanisms that govern these interactions using emerging theoretical models and predictive approaches. Alongside Ion Beam Analysis and more traditional modification techniques such as ion implantation, ions offer a wide range of possibilities for tailoring material properties and advanced material design.