Nanostructured materials | Jožef Stefan Institute Ljubljana, Slovenia

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Towards solving the $Nd_2Fe_{14}B$-surface-magnetism puzzle

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During the last decades, significant efforts have been made to improve the performance of $Nd_2Fe_{14}B$-based permanent magnets, essential in various contemporary technologies. Although $Nd_2Fe_{14}B$ in theory exhibits exceptionally high magnetocrystalline anisotropy, real magnets often fail to reach this intrinsic potential. The discrepancy is commonly attributed to microstructural effects such as the presence of secondary phases, grain boundaries and interfaces, and secondary phases, highlighting the importance of reduced-dimensionality effects.

While surfaces and thin films are generally expected to enhance magnetic anisotropy due to the breaking of the respective-bulk symmetry, $Nd_2Fe_{14}B$ surfaces are often regarded as the source of a degraded magnetic performance. This raises a fundamental question: do $Nd_2Fe_{14}B$ surfaces preserve the bulk crystal structure, or do they undergo surface reconstruction, and how does this impact the magnet properties?

In this talk, I will present recent studies on the surface structure of $Nd_2Fe_{14}B$, with particular emphasis on surface reconstruction and expected termination planes.

Kindly invited.