

SEMINAR I

Friday, 10.05.2024, 11:30, IPS Lecture Room

Novel Synthesis Approach for High-Entropy Oxides

Lara Einfalt

Catalysis is a process that occurs almost everywhere, from the human body to large-scale industrial processes. Hence, the requirements for a suitable catalyst are very demanding, and finding a successful one can be challenging. High-entropy oxides (HEOs), consisting of five or more elements, hold promise for applications in energy storage and catalysis because they offer exciting and unexpected features, such as a single structure, a high-entropy effect, a lattice-distortion effect, and a synergistic effect of components. However, synthesis methods can affect their properties, with some routes yielding low surface area, limiting catalytic utility. To overcome this issue, we can synthesize a layer of single-phase oxide nanotubes on a high-entropy alloy (HEA) substrate by anodic oxidation. It is a self-organizing process, a direct and elegant electrochemical approach to fabricating HEO nanotube arrays with a larger surface area and improved charge separation.

This seminar will overview the fundamentals of HEOs and their synthesis methods for catalytic applications. Furthermore, anodic oxidation as a novel synthesis technique for fabricating metal oxide nanotube arrays on TaNbHfZrTi HEA precursors and their potential use in photocatalysis will be presented.

Kindly invited.