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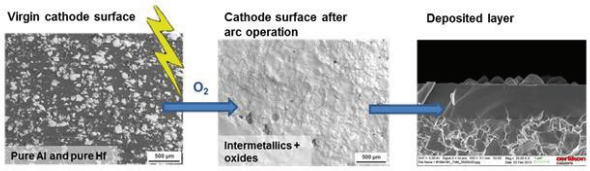

Figure 1. SEM images of a composite Al-Hf cathode surface before (left) and after the arc operation (middle) and the associated deposited layer (right).

Keywords: in-situ XRD, hard coatings, intermetallics, target processes, layers

MS43-P10 Thin film polymorphism in organic semiconductors

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Polymorphism is a phenomenon which is crucial to the understanding of crystal nucleation and growth, and establishment of structure−property correlation.[1] It is a phenomenon with high industrial significance particularly in pharmaceutical industry. Given the importance of polymorphism in determining the property of materials, a topic of recent interest is to study how it affects the performance of functional materials in the field of organic electronics. Although, presence of several polymorphic forms facilitates the study of charge-transport behaviour with respect to crystal packing, it may hinder the reproducibility, reliability, and stability of the devices fabricated using such materials. Research is being carried out to identify specific polymorphic phases of organic thin films, where the polymorphism exists near the substrate.[2] Depending on film thickness, deposition methodologies, temperature etc, a particular phase may exist. Under certain circumstances it may be possible to induce transformation from one phase to another. The physical and chemical factors that drive such a process are not yet clearly understood. Hence, it is of utmost importance to identify the phases and to control the formation of the different forms. In particular, this is really crucial in the field of organic electronics, where the charge-transport properties are highly dependent on crystal packing, especially for organic field-effect transistors where charge transport occurs at the interface between the organic semiconductor and the dielectric. In this presentation, we present an overview of the recent advances done in our group in this topic. Especially, [1]benzothieno[3,2-b][1]benzothiophene (**BTBT**) based semiconductors which are gradually emerging as the most promising organic semiconductor are the principal objects of our study. Structural and morphological studies of library of BTBT-based compounds are presented to gain more insights into the phenomenon.

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