**High-power impulse magnetron sputtering as a knob for tailoring transparent conductive oxides**

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Transparent conductive oxides (TCO) are undoubtedly one of the most important classes of materials today. The challenges of our civilization in the field of energy self-sufficiency and sustainability cannot be solved without them. Since TCOs combine two generally contradictory properties (electrical conductivity with optical transparency), precise control of their composition or structure is necessary.

High-power impulse magnetron sputtering (HiPIMS) is an advanced magnetron sputtering method. Thanks to the pulsed energy supply to the discharge it is possible to achieve very high target power densities (up to a thousand times higher compared with a standard dc magnetron sputtering) and thus to some extent control the energy supplied to the growing layer. This allows, for example, the influence of the crystallinity and other properties of the layers. In addition, different parameters of the plasma discharge under different discharge conditions (voltage pulse length, target power density, etc.) can lead to different transfer of the target material to the substrate. In the case of a compound target, for example, it is possible to change the elemental composition of the layer without having to change the elemental composition of the target.

In this presentation, we show several successful demonstrations of HiPIMS deposition of various TCOs, namely IGZO [1], AZO[2], WOx [3], V1-xWxO2 [4] or Cu2O [5].

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