

Highly transparent and conductive indium-free CaVO_3 and SrVO_3 crystallized at reduced temperature on glass using a 2D transparent nanosheet seed layer

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CaVO_3 and SrVO_3 are newly discovered transparent conductors, belonging to the group of perovskite oxides with strong electronic correlations [1]. This group of oxides offers also an important interplay between the structure of the material and the transport properties, having its impact on the optical properties through the modification of the charge carrier effective mass [2]. The technological potential of these new transparent conductors is largely related to the possibility of integrating vanadates on low cost substrates and especially on glass. In its amorphous form, vanadates are not conducting [3], imposing a growth approach keeping the crystalline character of the material.

In this work, we show the possibility to integrate crystalline CaVO_3 and SrVO_3 thin films by pulsed laser deposition thanks to $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ nanosheets seed layer prepared by exfoliation process of $\text{KCa}_2\text{Nb}_3\text{O}_{10}$ and deposited onto glass substrate using the Langmuir-Blodgett method. The seed layer induces the possibility to grow the films at a moderate temperature required for the integration on glass. Finally, by using transport and spectroscopic analysis, we are showing that their functional properties are competing with the best transparent conducting oxides known so far.

[1] L. Zhang *et al.*, Nature Materials 2015, 15, 204.

[2] A. Boileau *et al.*, Advanced Optical Materials 2019, 7, 1801516.

[3] A. Boileau *et al.*, Appl. Phys. Lett. 2018, 112, 021905.