Ferroelectric Inorganic Perovskite Oxides for Photovoltaic Applications

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Ferroelectric (FE) materials are under intense scrutiny for photovoltaic applications (PV), following the demonstration of above 8% conversion efficiency is FE-based solar cells [1]. In these cells, there is no need for a *p-n* junction because the electric polarization from ferroelectricity is responsible for the current flow.
The key issue for the development of oxide absorbers for PV is their bandgap that is generally above 3 eV. We produced Bi_2FeCrO_6 (BFCO) films by pulsed laser deposition (PLD) and demonstrate that their bandgap can be adjusted from 1.9 to 2.6 eV, depending on the growth conditions. We studied the evolution of crystallinity, optical, surface and electrical properties and optimized the films in order to produce all oxide solar cells.

References:

[1] R. Nechache, C. Harnagea, S. Li, L. Cardenas, W. Huang, J. Chakrabartty, F. Rosei, *Nature Photonics*, **2015**, 9, 61