

## DEPTOS

Mastering the faults in type P transparent semiconductor oxides



### INSPIRATION

Transparent and conducting thin layers are currently used extensively in several domains: low-emissivity windows, electrodes for solar cells, electrochrome mirrors, electromagnetic shields, etc. All of these devices are based on high conductivity ( $S > 1000 \text{ S/cm}$ ) type n transparent semiconductor oxides. In 1997, the discovery of the first type p transparent semiconductors provided for a new perspective for the realization of active transparent items, constituted by a junction of p-n. Up to now, the best semiconductor oxide has been  $\text{CuCrO}_2$  doped with Mg with a conductivity of  $220 \text{ S/cm}$ .

### INNOVATION

The DEPTOS project focuses on improving the electrical conductivity and optical transmission for delafossite materials such as  $\text{CuMO}_2$  ( $M = \text{Cr}, \text{B}$ ). Three avenues for improvement are being studied:

- formation of Oxygen interstitials;
- formation of Copper gaps;
- combination of the two.

### IMPACT

To improve the current performances of transparent oxide semiconductors, DEPTOS will propose a new approach involving ion implantation as a means of controlling the Fermi level in the envisaged semiconductors.

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